COMMERCIALIZATION OF AGRICULTURE AND SOCIO-ECONOMIC DEVELOPMENT IN WESTERN UTTAR PRADESH

ABSTRACT

THESIS

SUBMITTED FOR THE AWARD OF THE DEGREE OF

Doctor of Philosophy

IN

GEOGRAPHY

By
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UNDER THE SUPERVISION OF
Dr. **NIZAMUDDIN KHAN**

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Abstract

ABSTRACT

Commercialization of agriculture with its multidimensional approach is the need of the hour. This diversified agricultural system is viewed as a result of a set of driving forces composed of demographic change, technological change, market creation, infrastructural development and macro economic and trade policy. It has been viewed that commercialization of agriculture is occurring in some regions while in other there is stagnation or even a reversal to subsistence agriculture. The green revolution of 1960s was aimed to stimulate agricultural production primarily by replacing traditional hardy varieties of crops by high response varieties of crops. Even new agricultural policy emphasizes commercialization, value addition and export of agricultural commodities, besides globalization. Further, commercial agricultural products have high employment elasticity and can be suitable for over all development of the region. Thus, a well developed commercial agriculture and agribusiness sector could continue be a major engine of income and employment growth for the region, despite the tremendous opportunities ahead. Keeping in view the importance of commercialization of agriculture and its impact on socio-economic development in western Uttar Pradesh, the region has been selected as an area for detailed study because the area under investigation is rapidly changing from traditional agriculture to commercialization of crops and industrial activities.

The main objectives of the study are to measure the production and yield of major commercial crops of the region. Taking into consideration of agricultural commercialization, the trends and pace of commercialization of agriculture and its impact on socio-economic development on peoples of the region has been included into its objectives. Further, spatio-temporal development of commercialization of agriculture has been examined and suitable guidelines for further

development of commercial agriculture in western Uttar Pradesh has been out lined. Different standard statistical techniques like composite Z-score, linear simple coefficient correlation and triennium based on index numbers were used to derive some specific, concise and scientific conclusion of the processed data. Along with quantitative and qualitative techniques cartographic techniques were also used for construction of required maps. The eleven major commercial crops and twenty six variables of socio-economic and agro-socio-economic have been taken for a detailed and comprehensive analysis.

The present doctoral thesis entitled "Commercialization of agriculture and socio-economic development in western Uttar Pradesh" has been divided into four chapters excluded by conclusion and suggestions. The first two chapters are purely theoretical, while the last two are mainly experimental. The first chapter describes the introduction, significance of the study, objective of the study, methodology and review of work done. It incorporates in detail, the multidimensional aspect of the commercialization of agriculture in various parts of the world, especially in western Uttar Pradesh and in India. The second chapter deals not only the topography, drainage, ground water, climate and soils of western Uttar Pradesh but also gives a brief account of socio-economic profile of the study area. This socio-economic profile of the region has economy, agriculture scenario, industry, education, demography, urbanization and infrastructure under its sub-headings. Changing growth pattern of major commercial crops have been described exclusively in the third chapter. Area, production and the yield of major crops have been taken for the assessment and analysis. The chapter fourth has been fully devoted to examine the socio-economic development of the region. A range of multivariate indicators have been chosen for elaborative study. The relationship of commercialization of agriculture and its possible impacts on the peoples

of the region have been minutely observed and explained through the technique of simple coefficient correlation. Finally conclusion and suggestions are given.

After an over all assessment of the present work, it may be concluded that the region, one way and the other way is moving on the path of commercialization of agriculture; food market at all levels are under going profound changes that are fuelled by rapid urbanization; diet diversification; trade integration; and the liberalization of foreign direct investment in the food sector. This led the most commonly observed changed in commercialization and diversification of domestic products. It has been observed that investment in rural agricultural infrastructure can play a crucial role towards agricultural commercialization in the region. Further, high value agricultural products have high employment opportunity. Thus, this new trend of agriculture and agribusiness sector could be a major engine of income and employment growth for the region.

Socio-economic data of the region suggest some strengthening of certain economic and social indicators, but also a number of areas for concern. Absorbedly, there is a considerable variation in economic and social conditions across the region. The region does not fair much better in terms of education than it does in health. It has been seen that levels of poverty contribute poor levels of performance on social indicators of development. As it is clear that agriculture has special significance for low income, poor and vulnerable sections of rural society of the region because of these reasons agriculture is at the core of socio-economic development of the society and proper policy for agricultural sector is crucial to improve living standards and to improve welfare of the masses. The increase in yields and agricultural productivity in rural areas of the region can be transmitted into development gains for the rural poor. The findings of commercialization lend ample support to an

approach that aims to capture the employment and income gains from commercialization that are beneficial for the poor.

Correlation analysis of the region reveals that education, income, communication facilities and per head electricity consumption is positively related to average production of the percentage of commercial crops. This shows that economy of the region is largely dependent on agricultural sector. This sector determines all walks of life to the concerned people. So, the growth of agriculture is essential for the development and progress of the region and for over all growth of economy. This growth rate is an important requirement for improving living standard of those who are dependent on agriculture.

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CERTIFICATE

This is to certify that **Shahid Ali Khan** has completed his research work for the award of Ph.D. degree under my supervision. This thesis is entitled **"Commercialization of Agriculture and Socio-Economic Development in Western Uttar Pradesh".** This work is an original contribution to knowledge in the field of Agriculture Geography and in my opinion it is fit for submission and evaluation.

Date: 02/09/09

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(Shahid Ali Khan)

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Chapter -1

Introduction

Commercialization of agriculture is viewed as the result of a set of interacting driving forces composed of demographic change, technological change and market creation, infrastructural development and macro economic and trade policy. It is clarified that the nature of backward linkages from agricultural processing to farms is very much a function of project design and legal arrangements in the more integrated modernizing agriculture. Although commercialization of agriculture might essentially be considered a matter of stimulated private Sector activity, public action is also crucial to facilitate the power of its "driving forces". The Principal driving forces of commercialization are macro and trade policies, market reform, rural infrastructure improvement, and the development of legal and contractual environments in which farmers and processors may operate. Policies related to these driving forces will strongly influence the nature and speed of the agricultural commercialization process. The commercialization of agriculture is occurring in some regions while in others there is stagnation or even a reversal to subsistence agriculture on a large scale.

Low income farmers practice subsistence production, rather than growing cash crops. Globally it is, largely, a misallocation of human and natural resources. And it is becoming less viable due to population pressures and natural resource constraints. About 440 million farmers in developing countries still, practice mainly subsistence agriculture on much of their land, leaving behind the potential benefits from domestic and international trade. Subsistence crops cover more than 50 percent of land resources in the majority of low income countries. Yet, the changing ecological problems, and land constraints and rapid urbanization call for change (Von Braun and Kennedy, 1988).

The Green Revolution of 1960s was aimed to stimulate agricultural production, primarily, by replacing traditional hardy varieties of crops by high response varieties of crops. And, also by increasing the use of fertilizers and plant protection chemicals, hybrids bringing more cultivated area under

irrigation structures and consolidation of land holdings to make agriculture amenable for mechanization.

The new agricultural policy emphasizes commercialization, value addition and export of agricultural commodities, besides globalization. In order to achieve this, a set of approaches are required. As the traditional agriculture is transforming into hi-tech agriculture, the need for updated information is also essential for agricultural production and productivity, eventually giving a lucrative yield and income to the farming community.

Commercial agricultural production has received adequate attention of researchers. This has resulted in establishment of regulated markets with an aim to see that the agricultural produce get better price. Rural infrastructure, importantly, play a crucial role in inducing farmers to move towards a commercial agricultural system. The emphasis for public investments should be on improving general transport, communications and market infrastructure, while allowing the private Sector to invest in commodity specific processing, storage and marketing facilities. Accessible and cost effective communication systems such as mobile telephones can help to generate information and other market related services. The related technologies and reduced exchange and search costs may be highly indicative of the potential benefits for developing countries like India.

1.1 SIGNIFICANCE OF THE STUDY

Commercialization of agricultural systems leads to greater market orientation. The study reveals the existence of marked regional differences in agricultural development. It shows that both rates of growth of agricultural output and levels of acceptance of modern technology in agriculture vary from one region to another. The cause of differences appears to be primarily socio-economic. Commercialization and diversification of agriculture ensure value addition to agricultural produce, generate employment, enhance income

of farmers, and create surplus for export of processed products. Increasing commercial orientation of Production system is expected due, inter alia, to rapidly rising urban food demand, changing consumption pattern and the increasing integration of domestic and international markets for agricultural products.

For the emergence of new export market opportunities for many of the commercial products on high value agricultural products, owing to trade liberalization, and there is a happy match between the demands of the market and the need for farmers to diversify into high value activities. Further, higher value agricultural products have higher employment elasticity and can be suitable for small holder, if they can participate. In this trend of commercial aspects, more of the energies and resources of the agricultural sector can be used to produce the kinds of high value foods and products that are now in high demand by India's growing middle classes and urban dwellers and that have new export market opportunities. A well developed agricultural and agribusiness sector could thus continue to be a major engine of income and employment growth for the country, despite the tremendous opportunities ahead.

Rising productivity in the agricultural sector has accelerated growth in the non-agricultural sectors through forward and backward linkages. In the long term, the commercialization of agriculture broadens participation in market led growth. Promoting suitable use of natural resources, improving rural infrastructure, research and communications, facilitating the functioning of markets and enhancing rural institutions are integral parts of the strategy. Productivity induced agricultural growth has a wider impact on rural areas through the strengthening of off farm activities, rural employment and wages thus, moving the society, region and country on to the agricultural transformation trajectory. The best assurance of food security in agriculture-dominant countries especially in nations like India can be provided through the accelerated growth of food and other agricultural products and the

introduction of cost-reducing technological changes in agriculture through a judicious combination of investment in agricultural, research and technology transfer system, the creation of rural infrastructure and the provision of an incentive frame work for the farmers.

It findings can be helpful in identifying the driving forces of increasing commercialization of subsistence agriculture and assess their effects on house hold real incomes, food consumption, expenditures on nonfood goods and services and nutritional and health status in different settings; nevertheless, it has been seen that policy has a key role to play in shaping the successes and failures of commercialization from a growth and poverty perspective.

Commercialization reveals impressive employment and welfare effects for the poor. Agricultural commercialization plays a critical role for growth, employment expansion and social welfare, including dramatic improvements in rural nutrition. The findings lend ample support to an approach that aims to capture the employment and income gains from commercialization that are beneficial for the poor, and to combine this approach with policy awareness to prevent market failures.

The challenges faced by small holder agriculture should be seen in the context of the general trends that will influence the structure of agricultural production. Namely, the transformation of diets and rising import competition will contribute to the increasing commercialization of the small farm sector. Governments ought to help to create an enabling environment for small holder commercialization through infrastructure investments and institutional reform.

Sometimes adverse circumstances for the poor under commercialization arise not because of the inherent nature of the commercialization opportunity but because of bad policy. Trade restrictions and ill advised tenancy laws are government actions that may turn a

promising opportunity into a disadvantage for the poor. The answer of these issues required policy reform rather than reversal or deceleration of commercialization.

Generally, the smallest farm households participate less than proportionally in their respective commercialization schemes, but when they do participate they tend to be more radical adopters of the new commercial crops. Efforts to combine the smallest farms into the schemes can be enhanced through legal arrangements. Commercialization of agriculture involves considerable expansion of demand for hired labour virtually, in all study environments, but particularly much processing is needed.

Income and employment benefits of commercialization are not spread equally within house holds. Generally women's work in agriculture is reduced not only relatively but also absolutely with rising income. In rural areas of low income regions, there is need to trace out relationship between agricultural commercialization and economic development in order to design the suitable rural growth policies that benefits the poor. In view of the challenges of rapid urbanization and chances of commercialization, the question is not if subsistence agriculture should be over come, but how? Thus. the purpose of the study is to clarify concepts, add comprehensive factual information, and assist policy and programme analysts in identifying potential and risks of promoting commercialization of agriculture for poverty alleviation.

In designing and implementing future projects and policies for commercialization; the goal would be for policy markers to find ways to enhance the beneficial outcomes, while minimizing the potentially harmful ones.

1.2 OBJECTIVE OF THE STUDY:

The objective of the study is to assess and prioritize opportunities for commercialization of agriculture and agricultural growth with strong focus. This will contribute to the longer term goal of raising rural incomes and reducing poverty by raising the productivity of land in a sustainable manner through diversified agricultural production and enhanced employment in the marketing system. The study will produce a comprehensive synthesis document that identifies opportunities, constraints, and strategies. Prioritizes approaches for development of commercial agriculture in western Uttar Pradesh as well as in India and identifies complementary policy and institutional reforms needed.

Thus, the main objectives of the study are as given below

(1) To examine the trends and pace of commercialization of agriculture and its impact on socio-economic development on peoples of the region.

(2) To assess and analyze production and yield of major commercial crops of the region.

(3) To examine and measure the spatio-temporal development of commercialization of agriculture with reference to innovation and diffusion of technology.

(4) To suggest suitable guide lines for future development of commercial agriculture in western Uttar Pradesh.

1.3 METHODOLOGY:

The methodology involves selection of main cash crops /commercial crops grown and economies of cultivation and returns. An attempt has also been made to select a set of indicators suitable for the purpose of showing socio-economic development of western Uttar Pradesh. The methodology lay

much stress on employing statistical models, analysis and interpretation of data.

The work is based on available sources of secondary data. The secondary data are obtained from published literature, government reports and District Statistical Bulletins, Directorate of Agriculture and Food Production, District Gazetteer, Survey of Indian Topo-sheets, Census of Indian Statistics, Conference Proceedings (Newspapers and other periodicals) and Uttar Pradesh Statistical Bulletin.

The collected data were processed in tabular form initially. Different standard statistical techniques like composite Z-score, linear simple correlation were used to derive some specific, concise and scientific conclusion. Along with quantitative and qualitative technique, cartographic techniques were also used for construction of required maps. The area, production and yield kg/hectare have been calculated on the basis of triennium based on index numbers. The eleven major crops of western Uttar Pradesh, namely Wheat, Barley, Potato, Total cereal, Total pulses, Total food-grains, Total oil seed, Total rice, Total maize, Onion and Sugarcane have been chosen for comprehensive study and analysis.

To knowing socio-economic development of western Uttar Pradesh, a set of indicators have been selected.

Economic Indicators have been categorized as under –

Economic Indicators

1. **Income**
   - (i) Deposit in National Income
   - (ii) Deposited money per person
   - (iii) Actual Expenditure.
2. **Credit facilities**
   - (i) Nationalized Bank Branches
   - (ii) Others

(iii) Communication facilities

(iv) Number of telephones / Lakh population

Similarly, social indicators have been grouped for the purpose to know the level of social status under the following main heads.

SOCIAL INDICATORS:

1. Education

No. of schools /lakh population

(i) Junior Basic School.

(ii) Senior Basic School.

(iii) Higher Secondary School.

(iv) Degree College.

Teacher Pupil Ratio

(v) Junior Basic School

(vi) Senior Basic School.

(vii) Higher Secondary School.

(viii) Degree College.

2. Road ways

(i) Total length of Roads (Pakka Roads)

3. Electricity

(i) % of electrified village in total inhabited villages.

(ii) % of electricity consumption in agriculture division in total electricity consumption.

(iii) Per head electricity consumption (Kilowatt hrs.).

4. Health Facilities

(i) Primary Health Centres

(ii) Family and mother child welfare centre.

(iii) Family and mother child welfare sub-centre.

And, the agro-socio-economic indicators may be categorized as-

1. Agro socio economic indicators

(i) Crop density /intensity.

(ii) % of area under commercial crops.

(iii) Average production of food crops (Quintals).

(iv) Fertilizers used per hectare.

(v) % of net area irrigated in gross cropped areas.

1.4 REVIEW OF WORK DONE

The works of agricultural scientists and planners, geographers and economists, on the issue of agricultural commercialization, production and productivity, diffusion of technology, crop combination, cropping pattern and so on are of great value and immense importance. Studies have been conducted by various organizations and individuals to estimate the level of agricultural development and the scale of commercialization of agriculture and its impact on socio-economic development on the peoples of the region.

Specialization and the development of markets and trade are fundamental to economic growth which characterizes commercialization. Despite of new researches and trends and to large extent a major change in the field of agricultural sectors, today, about 440 million farmers in developing countries still practice subsistence production to a significant extent. A large proportion of land resources in low income countries devoted to subsistence cropping (Von Braun and Kennedy, 1988).

Commercialization of agricultural systems leads to greater market orientation; progressive institution out of non-traded inputs for purchased inputs; and the decline of integrated farming systems (Prabhu L. Pingali, 1999). In the Process of commercialization, rapidly increasing scales of production are being observed particularly in the livestock sector, trying to supply rapidly growing markets for meat, milk and eggs. Both global analysis and country case studies (conducted by FAO in Brazil, India, Thailand and the Philippines) confirm that advanced technology embodied in breeds and feeds appears to be critical to the success stories for poultry around the world. Thus, there is strong reason to believe that technology itself is a prime driver of the displacement of small holders from the livestock sector. Namely, the transformation of diets and lasing import competition will contribute to the increasing commercialization of the small farm sector. Governments ought to help create an enabling environment for small holders' commercialization through infrastructure investments and institutional reform, furthermore efficient land markets and secure property right are essential to capture agricultural growth (Binswanger et.al. 1993).

IFPRI (The International Food Policy Research Institute) in collaboration with other institutions conducted comprehensive micro level studies in five countries – the Gambia, Guatemala, Kenya, the Philippines and Rwanda at carefully selected programme or project sites where farm house holds had recently switched from semi subsistence staple food production with low levels of external inputs to production of more crops for sale in the market or to production with new in puts and technology (IFPRI). The study areas were selected especially for their recent experiences with the transition to commercialization, in order to capture potential adjustment problems and to identify appropriate corrective measures. Macro economic policies, including trade and exchange rate policies, play a fundamental role in commercialization of agriculture. The critical role of incentives is now well understood (Krueger, Schiff, and Valdes 1988, Mellor and Ahmed, 1988).

It is possible to study the process of commercialization in specific contexts and to identify key factors that leaded to either beneficial or detrimental outcomes, consumption or nutrition. This will provide guidance for policy formulation in this area. In designing and implementing future project and policies for commercialization, then the goal would be for policy makers to find ways to enhance the beneficial outcomes, while minimizing the potentially harmful ones.

The diet transition is characterized by diversity, convenience, and a break from traditional consumers in large, urban centres are more exposed to non-traditional foods as a result of their access to food retail out lets and marketing campaigns (Reandom, Timmer, et al, 2003). Large urban markets create the scope for the establishment of large supermarket chains, and they attract foreign investments and advertising from global corporations. Non traditional foods are more accessible as a result of trade liberalization and declining cost of transportation and communication (Chopra, Galbanath and Darnaton Hill 2002). The comprehensive synthesis of original empirical research, including village and household level studies in 12 countries suggests that it is not just short term policies to make the best of situations with deficient markets that are needed for agricultural commercialization, but also long term policies to create and develop agricultural markets where they are particularly risky. More knowledge is needed to stimulate and supplement the process of agricultural commercialization and where needed, to guide it in the interests of the poor learning from experiences in different settings can help (the International Food Research Institute).

In order to benefit from trade liberalization reform, there is need to enhance domestic competitiveness through policy and institutional reform (FAO 2005). Liberalization of domestic markets through removal of quantitative restrictions on trade and opening of economies to internal trade opportunities is often a key step in starting or accelerating the process of commercialization. Effective rural financial institutions will also helpful in

spreading and in the sharing of the benefits of commercialization more widely across the community and region. It has observed that in underdeveloped countries both traditional agriculture and agriculture, generally, starved of investment resources because private capital is deterred by the risk involved in agriculture (Schultz, 1964) and institutional investment has also been meager (Shonfield,1960). Therefore, special efforts and attention are required to direct and induce public and private investments in agriculture in under developed countries. The purpose of investment in agriculture is to generate capital in the form of infrastructure, improvement in quality of natural resources and assets and creation of productive assets for promoting long run growth and improving efficiency in production and marketing.

A synergistic relationship exists between agricultural commercialization and technological change (Binswanger and von Braun, 1991). The potential lead role of technological change in food crops for agricultural and rural growth is also now well understood (Hazell and Ramaswamy, 1991; Mellor 1986). What is less well known, it seems, is the potential for agricultural commercialization to take a lead position in agricultural growth stimulation too. The speed at which commercialization of agriculture is occurring in some countries, while in others there is stagnation or even a reversal to subsistence agriculture on a large scale, combined with the challenge of economic restructuring and shift from planned to market oriented economies in many low–income countries, urgently demands enhanced knowledge to stimulate and supplement the process of agricultural commercialization, and, where needed to guide it in the interests of the poor. Nevertheless, as it has been assess that policy has a key role to play in shaping the successes and failures of commercialization from a growth and poverty perspective.

At the time of independence, with relatively high food grain prices the country experienced a wide gap between demand and supply. The problem was compounded by the relatively high rate of population growth. Taking the

problem of food shortage and the provision of food security for the rapidly increasing population was, therefore, the priority areas of development and planning at that point of time (Bhalla, 1994).

Therefore, the country's post independence history of social development has highlighted food as a corner stone of the national strategy to accord some measure of social protection to vulnerable citizens. India's development policy after independence had in niche for food based anti-poverty and social protection programmes (Medrano, 2004).

The period from 1950/51 to mid 1960s which is also called pre-Green revolution period witnessed tremendous agrarian reforms. Institutional changes and development of major irrigation projects land ceiling acts were imposed by all the states to eliminate large sized holdings and cooperative credit institutions were strengthened to minimize exploitation of cultivators by private money lenders and traders (Radhakrishna, 1993). Land consolidation was also affected to reduce the number of land fragments.

For analyzing the evolution of food policy and agricultural development strategy, the period after India's independence can be divided into four phases, viz, 1947 to mid -1960s, the mid 1960s to the early 1980s and from the early 1990s to the present day. The main concern of the food policy until the mid-1960s was to ensure that the gap between demand and supply of food did not result in an excessive rise in consumer prices of food. Similarly, to the pre-independence period, emphasis continued to be focused on food imports, price controls and food rationing. During the early 1960s, the intensive agriculture district programme (IADP) and intensive agriculture area programme (IAAP) were launched in selected districts having the potential to increase food production.

During the early 1980s, the policy of agricultural development was to achieving the new strategic objective, the three support approaches were

extended to non-food grain crops, i.e., technology, inputs and marketing. As a result the production of non cereal food items such as edible oil seeds, fruits, vegetables, spices and livestock products increased.

National sample survey organization indicates a declining trend in the per capita consumption of cereals in both rural and urban areas from the early 1970s to 1999/2000, accompanied by a decrease in the proportion of expenditures on cereals and an increase of that on milk, meat, eggs, fruits and vegetables (Sitvarajan and Ravi Shankar 1996, Dev 2003). Improve availability of staple food at declining real prices has contributed to improved nutritional security. Farmers have shifted from the low yielding coarse cereals to non-cereals food products since the middle of the 1980s (Acharya 2003 a), a fact which has inter-alia helped to increase production and availability of edible oils, sugar, fruits, vegetables, spices, milk, eggs, meat and fish products.

The biggest achievement of new agricultural strategy, known as Green Revolution was a planned strategy of the time when the country faced severe food shortage and crisis in early 1960s which forced the policy makers to realize that continuous reliance on food imports and aid imposes heavy costs in terms of political pressure and economic instability (Rao, 1996) and there was a desperate search for a quick break through agricultural production. The situation of Indian agriculture improved considerably after the mid 1960s when new agricultural development strategy and food policies were adopted. The production of staple cereals increased substantially, mainly contributed by productivity improvements. There was also an improvement in physical and economic access of house holds for cereals and other nutritive food products.

This period of green revolution technology, has been attainment of self sufficiency in food grains. Since the green revolution technology involved use of modern farm inputs, its spread lead to fast growth in agro input industry.

Agrarian reforms during this period took back seat while research extension, input supply, credit, marketing, price support and spread of technology were the prime concern of policy makers (Rao 1996). Increase in productivity became the main source of growth in crop output and there was significant acceleration in yield growth in green revolution period. The main source of productivity increase was technological break through in wheat and rice. The Green revolution followed the introduction of high yielding varieties of wheat and rice in the late 1960s and began in Punjab, Haryana and western Uttar Pradesh. The gains in agricultural production that went along with the introduction of new technology lifted India from the status of food deficient country to a self sufficient one. The seed fertilizer technology that came about via agricultural research and development made it possible to dramatically increase yields, making the use of existing land more efficient. Dattt and Ravillion (1998) found that higher agricultural yields reduce rural poverty. The authors studied the effects of higher wages and found that the higher agricultural wages and yields both diminish poverty with roughly the same elasticity, the gains to the poor from higher yields reach beyond those near poverty line. One of the main requirements for HYV seeds that sparked the Green revolution is the assured and timely irrigation (Sharma and Poleman, 1991; Pant, 2003).

During the post Green Revolution period, the impact of farm mechanization on agricultural production and productivity has been well recognized in India. Depending upon the use of other inputs such as irrigation high yielding varieties seed, chemical fertilizers, herbicides and pesticides, consequently the agricultural production and productivity have witnessed three fold increase. Thus, the India's agricultural achievements since the green revolution in the 1960s have been significant. Major improvements have occurred in productivity, land irrigation, seed quality and use of fertilizer. Agricultural production has grown at an average annual rate of

around 3.5% over the last five years, out pacing annual population growth of about 1.9% and accounts for 20% of India's total exports.

The contribution of agricultural mechanization has been well recognized in enhancing the production together with irrigation, biological and chemical inputs of high yielding varieties seed, fertilizers, pesticides and mechanical energy. In the 20th century, in India, this trend of agricultural mechanization has been adopted on large scale benefiting small, medium and large size farms. Several studies have been conducted on the impact of agricultural mechanization on production, productivity, cropping intensity, human labour employment as well as income generations. Different studies have brought out that farm mechanization greatly helped the farming community in the over all economic upliftment. Further more, farm mechanization increased agricultural productivity and profitability on account of timeliness of operations, better quality of work and more efficient mechanization of crop inputs.

Regression analysis reveals that the spatial variation of land productivity is positively related to fertilizer use, irrigation and urban Industrial development and is negatively related to population density (Edisow Dayal, 1984). There are large regional inequalities in the levels of productivity. Three indexes of agricultural productivity land productivity, labour productivity and aggregate productivity have been employed to measure the map productivity patterns in India. Areal variations, also, in food grain sufficiency are of great consequence in India due to its unique cultural and economic conditions such as firmly established food habits, the subsistence nature of farming and the poorly developed transport facilities (A.K. Chakravarti, 1970).

The effects of higher levels of agricultural inputs in India as a whole and within different regions in India have been studied (Bhalla and Singh, 2001) to employ a ridge regression analysis in an attempt to over come the

problem of the high degree of multi-co-linearity among the explanatory variables included in their analysis. In their ridge regression analysis of the north west region over three periods (1970-73,1980-83, 1990-93), as well as in the pooled period (1970-93) they found that the coefficient of all the included input and infrastructure variables were positive and statistically significant. In relation to their all India analysis , the authors found that the north west region showed higher production elasticity for fertilizers, tube wells, tractors, irrigation and regulated markets, suggesting that production in the region was more responsive to modern inputs and infrastructure.

Another regional study of growth of Indian agriculture shows that both rates of agricultural growth out put and levels of acceptance of modern technology in agriculture are higher in the southern and western states than in the eastern and north-central states. The cause of the differences appears to be primarily socio-economic, coefficients of correlation of the agricultural growth rates and of the index of use of modern inputs with such factors as the index of development of services and the index of urbanization are significant (Nath, 1969).

Many early analysts (Rosenstin Roden, 1943; Lewis, 1954; 29 Scitovsky, 1954; Hirscheman, 1958, Jorgenson, 1961 ; Fei and Ranis, 1961) , too, highlighted agriculture because of its abundance of resources and its ability to transfer surpluses to the more important industrial sector. The conventional approach to the roles of agriculture in development concentrated on agriculture's important market mediated linkages.

Experience has shown that whenever India needed to enter the world market to buy food grains (wheat), the price was higher than the world market average (Chand, and Jha, 2001). This is because in the world wheat market, the characterization of India as a small country is not favourable to the country. Therefore, a large populated country like India should continue to maintain a reasonably high degree of self sufficiency in food grains.

Agricultural growth has its importance in the process of economic development. There is examples from industrialized countries as well as countries that are rapidly developing today indicate that agriculture was the engine that contributed to growth in non-agricultural sectors and to over all economic well being. Economic growth originating in agriculture can have a particularly strong impact in reducing poverty and hunger. Increasing employment and incomes in agriculture stimulates demand for non-agricultural sectors and to goods and services, producing a boost to non-farm rural incomes as well. Countries that are well into the process of agricultural transformation and modernization will find themselves benefiting from expose to globalization trends. The Public policy needs to pay attention to inter-regional and intra-societal differences, particularly the prospects for small farm participation in commercialized markets. Subsistence production is mainly produce by low income farmers rather than growing cash crops because they usually considered that it is the safest option.

Relatively a high proportion of any income gain made by the poor is spent on food. The income effects of research induced supply shifts can have major nutritional implications, particularly, if those shifts result from technologies aimed at the poorer producers (Afston et al., 1995, P. 85). It has been widely observed that both micro-economy and macro economic reasons. no country has ever sustained the process of rapid economic growth without first solving the problem of food security (Timmer, 2002). Modern science and technology can help in providing new impetus for addressing the age old problems of yield improvement, production variability and food security for rural populations living in marginal production environments. Productivity growth that resulted from agricultural Research and Development has had an enormous impact on food supplies and food prices and consequent beneficial impacts on food security and poverty reduction (Hayami and Herdt, 1977; Pinstrup- Anderson et al., 1976; Binswanger, 1980, Harell and Hzaggblade, 1993).

The increasing trend of international trade, indirectly, affects the growth of non-agricultural sectors changing the domestic demand for agricultural growth both quantitatively and qualitatively (Pingali and Khwaja, 2004).

The rural economy started witnessing process of diversification which resembled into fast growth in non-food grain out put like milk, fishery, poultry, vegetables, fruits etc. which accelerated growth in agricultural Gross Domestic product during the 1980s. This growth seems largely market driven. A series of decisions have been taken by the Government of India in her new agricultural policy announced in July 2000 covering several fronts like incentive structure, infrastructure, technology, market development, extension, regulations, input supply, tenancy etc. It also provides direction to the future of agriculture in the country.

Latest studies of various countries show that the transformation of agriculture from its traditional subsistence roofs, induced by technical change, to a modernizing and eventually industrialized agriculture sector is a phenomenon observed across the developing world. (Desai and Namboodri, 1977) found that non–price factors had a greater influence on growth in total factor productivity (i.e. technical change) of agriculture than price factors and that the single most important determinant of technical change in agriculture was Government investment in agriculture research and development, education and extension services. Technical changes include new inputs like high yielding varieties seeds and fertilizers and services to ensure proper timing and application methods.

Agriculture is also important for low income, poor and vulnerable sections of rural society, because, agriculture is at the core of socio-economic development and progress of Indian society. And the proper policy for agricultural sector is crucial to improve living standards and welfare of masses.

The role of science and technology has also played a crucial role in increasing yields and production across the country and outside country as well. Biotechnology could be needed to develop in certain specific weather conditions. This would include the development of drought resistant, salt tolerant and pest resistant cultivation of different crops. This would ensure a strong approach to dealing with food security besides addressing climate change (Brenner, 1996).

At present large number of small holder producers intentionally try to maintain subsistence production along with new commercial production. Apparently, there is higher out put returns to land and labour from the cash crops. In low income countries, a large proportion of land resources are devoted to subsistence cropping (Von Braun and Kennedy, 1986), yet, a range of problems like fragmentation of land, environmental and ecological problems and expansion of urban centres emphasized a call for change. This can over come through improved technology which helps subsistence farmers to commercialize in low risk ways. Insurance markets and financial development can involve and produce better results in gains from commercialization. Policy makers should also accept responsibility for potentially economic environment in which small holders can take advantage of commercialization opportunities. Alternatively, preventing Commercialization would bar the poor from access to basic force of rural modernization and employment growth. There is a lot of scope for project policy and legal arrangements to foster success and prevent adverse effects of commercialization in the small holder sector. However, in a rapid rural growth environment, such as Indonesia in the 1980s, the broad based agricultural commercialization process in contrast to narrow isolated, project approach, to commercialization reveals impressive employment and welfare effects for the poor. This Indonesian case can be viewed as a more meso-level analysis and complement to the China case (The key roles of development strategy and trade policy for commercialization can be seen in largest

commercialization experiment of the 1980s, China's domestic trade and agricultural market reform). Both Indonesia and China represented cases where agricultural commercialization plays a critical role for growth, employment expansion and social welfare, including dramatic improvements in rural nutrition. Major improvement in nutrition observed in the fast growing South East Asian economics in the 1970s and 1980s is closely related to the developmental effects of commercialization of agriculture.

Improved communication and information is also crucial for agricultural development. New information and communication technologies are generating possibilities to solve problems of rural poverty, inequality and giving an opportunity to bridge the gap between information rich and information poor and support sustainable development in rural and agricultural communities. The challenges are not only to improve the accessibility of communication technology to the rural population but also to improve socio-economic status and its relevance to local development, more than natural resources, "more than cheap labour, more than financial capital: knowledge is becoming the key factor of production" (World Bank, 2000). The rapid growth of information in agriculture led to the progressive specialization and it is more so after the globalization of Indian agriculture. The New Agricultural Policy emphasizes commercialization, value addition and export of agricultural commodities, besides globalization.

As we are approaching towards traditional agriculture to its transformation into hi-tech agriculture, the need for updated information is also essential for agricultural production and productivity, eventually giving a lucrative yield and income to the farming community. The larger sects of small and marginal farmers who are on the verge of real under privileged, to whom the information technologies, role and help is needed in a big way. It is essential that information availability is demand driven rather than supply driven. The challenges are not only to improve socio-economic status and its reference to local development (Balit et al., 1997).

Obviously, India is an emerging food business hub. There are five largest multi national corporations engaged in the food business have been eyeing India as the great plum in planning their growth Strategies for the future.

After the introduction of economic reforms in 1991, there have been significant changes in rural development in India. The evidence on real agricultural wages, per capita expenditure on state domestic product is also in line with poverty trends. However, regional disparities in poverty, state domestic product etc, have increased significantly in the 1990s (Srinivasan 1999, Ahluwalia, 2000 and Deaton and Dreze 2002).

Lack of adequate market linkages and farmer skills capacity to produce for the market (Choice of appropriate varieties, post harvest handling and quality control etc) have emerged as the biggest challenges to sustaining productivity enhancement and income diversification. Farmers are responsive to change and prepared for diversifying their agricultural practices. Continuous attention is to be paid for motivating and training the farmers in latest technologies. Agenda for technological development and dissemination should be set according to farmer's requirements and must have market focus in its mandate. A gender sensitive approach is to be adopted in regard to various developmental programmes to ensure their sustainability.

Introduction of new agricultural and livestock production systems would be actively promoted and supported by an investment grant scheme targeted specifically at marginal land holders or the land less.

The works done by various Indian agricultural geographers under different projects and plans on the issue of technological diffusion, productivity, crop combination region, cropping pattern, new trends in agricultural sectors and so forth are of prime importance. In spite of tremendous efforts by geographers and agricultural scientist, a vast work is

still to be carried out by scholars for opening new horizons and frontiers in the field of increasing trends and role of commercialization of agriculture in present scenario.

1.5 CHAPTER SCHEME:

At first glance, this thesis entitled "Commercialization of agriculture and socio-economic development in western Uttar Pradesh" emphasized agricultural commercialization and its impact on socio-economic development. The most of the contentions issues and valid concerns, in knowledge have to be filled. For better understanding, the whole work is divided into four chapters including introduction and excluded by conclusion and suggestions. Thus, the thesis begins with the introduction, this chapter 1 in tune of succession, comprise significance of the study, objective of the study, methodology and review of work done. As outlined in more detail in the review of work done (Chapter 1), commercialization of agriculture is viewed as the result of a set of interacting driving forces composed of socio-economic change, technological change, market creation, infrastructure, and government policies. The chapter II deals not only the topography, drainage, ground water, climate and soils of western Uttar Pradesh but also gives a brief account of socio economic profile of the study area. This socio economic profile of the region has economy, agriculture scenario, industry, education, demography, urbanization and infrastructure under its sub-headings. The chapter III is devoted to examine the changing growth pattern of area, production and yield of major commercial crops at district level. The productivity indices have been calculated on the basis of triennium, considering major commercial crops grown in western Uttar Pradesh. The Chapter IV assesses the levels of socio-economic development and agro-socio-economic development and correlation between agro-socio-economic indicators and socio-economic variables. In order to capture potential adjustment problems and to identify appropriate corrective measures, a comparative study has been taken into consideration among variables.

Finally, the thesis is devoted to the conclusion. The findings lend ample support to an approach that aims to capture income gains and social upliftment from agricultural commercialization. At last, in the light of whole study and comprehensives analysis, some specific suggestions have been drown for remedial measures to over come major constraints in the process of commercialization of agriculture. In addition, this set of combined approaches can provide the best opportunity to further enhance and boost up the agricultural commercialization.

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Chapter -2

Geographical Outlook

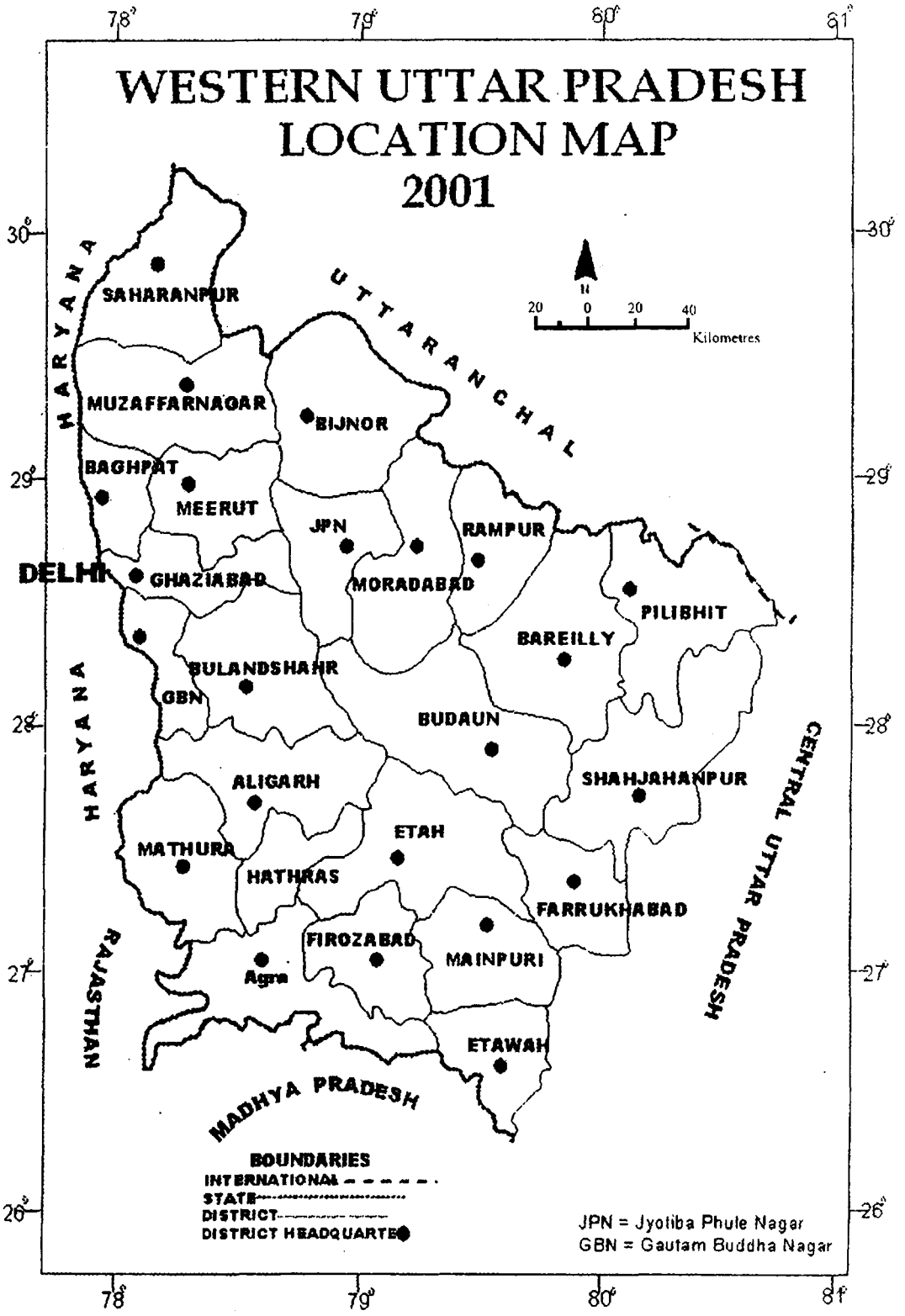
Western Uttar Pradesh lies approximately between 26°20' N to 29°45' N latitudes and 77° E to 80°E longitudes. It covers an area approximately 9920 sq. km.; it consists of twenty four districts. The study region is bounded by the districts of Kanpur, Hardoi and Kheri of the central region of Uttar Pradesh on the east, the state of Uttranchal on the north, the states of Haryana, Rajasthan and Union territory of Delhi on the west, and the states of Rajasthan, Madhya Pradesh and district of Jalaun of Buldelkhand region of Uttar Pradesh on the south, (Fig. 2.1).

Western Uttar Pradesh structurally is a part of Indo-Gangetic plain. It lies between the peninsular India in the south and recently built the Himalyan Mountains in the north. The east Gangetic Plain is the most important Plain and has been built up by the deposits brought up by the Ganga, the Yamuna and their tributaries. The region lies at an elevation of 150-300 meters above the mean sea-level. The mountains greatly influence the hydrology of the rivers. The surface level of the plain commanded and traversed by the glacial fed perennial rivers which offers every facility for the construction of great canals (Dakshi Namurthi, 1973).

The absence of any marked surface irregularity further permits the rains to sink into ground while percolation from major rivers and their tributaries also contribute to maintain the level of sub-soil water table.

2.1 TOPOGRAPHY

The area under consideration chiefly consists of detrital materials deposited by the great antecedent rivers like the Ganga, the Yamuna and the Indus. It is bordered by Siwaliks ranges of the Himalaya towards the north and by peninsular stable landmasses towards south. The main physiographic variations within the plain have been noted between upland *bhangar* and *alluvium* of *doab* which rises from 15 m to 60 m above the adjacent flood plain.



Source: Census of India, 2001

FIG.2.1

On the basis of micro level topographic facets and their regional characteristics. two physiographic units have been recognized, namely:

1. *Gangapar*, higher plain area in the north; and
2. Upper Ganga Yamuna *doab*.

The areas of north Bulandshahar and South Etah are composed of silt and clay of bhangar tract whereas the interior of Bulandshahar and Aligarh are alternated by depressions of sand ridges which are topographically more diversified. The nature of the deposits probably owes to the crescent bands of the two master streams, the Ganga and the Yamuna. Various land forms like natural lavees and sandy tracts are pre-dominant in the Ram Ganga catchments area of western Uttar Pradesh

2.2 Drainage:

Western Uttar Pradesh has a vast reservoir of surface and under ground water. Being a part of alluvial plain of Uttar Pradesh, The region has drained by perennial rivers of the Ganga system. Apart from surface drainage system, this plain also has an immense reservoir of fresh water. The reservoir of fresh water has been stored in the more porous, coarser strata, beneath the level of saturation, which is easily accessible by means of ordinary borings (Wadia, 1961) in the form of rainfall or snow fall. The region is drained by the Ganga, the Yamuna, the Ramganga and several tributaries. These are perennial rivers originating from the Himalayas. These rivers have water throughout the year and yield supply of fresh water which can be gauged and used for irrigation (Fig. 2.2).

2.2.1 The Ganga River:

The Ganga River has a very large basin; it rises from the Gangotri glacier in the Himalayas and enters the *upper doab* plain at Haridwar through a well defined gorge in the Siwaliks. The Solani River joins the river Ganga in

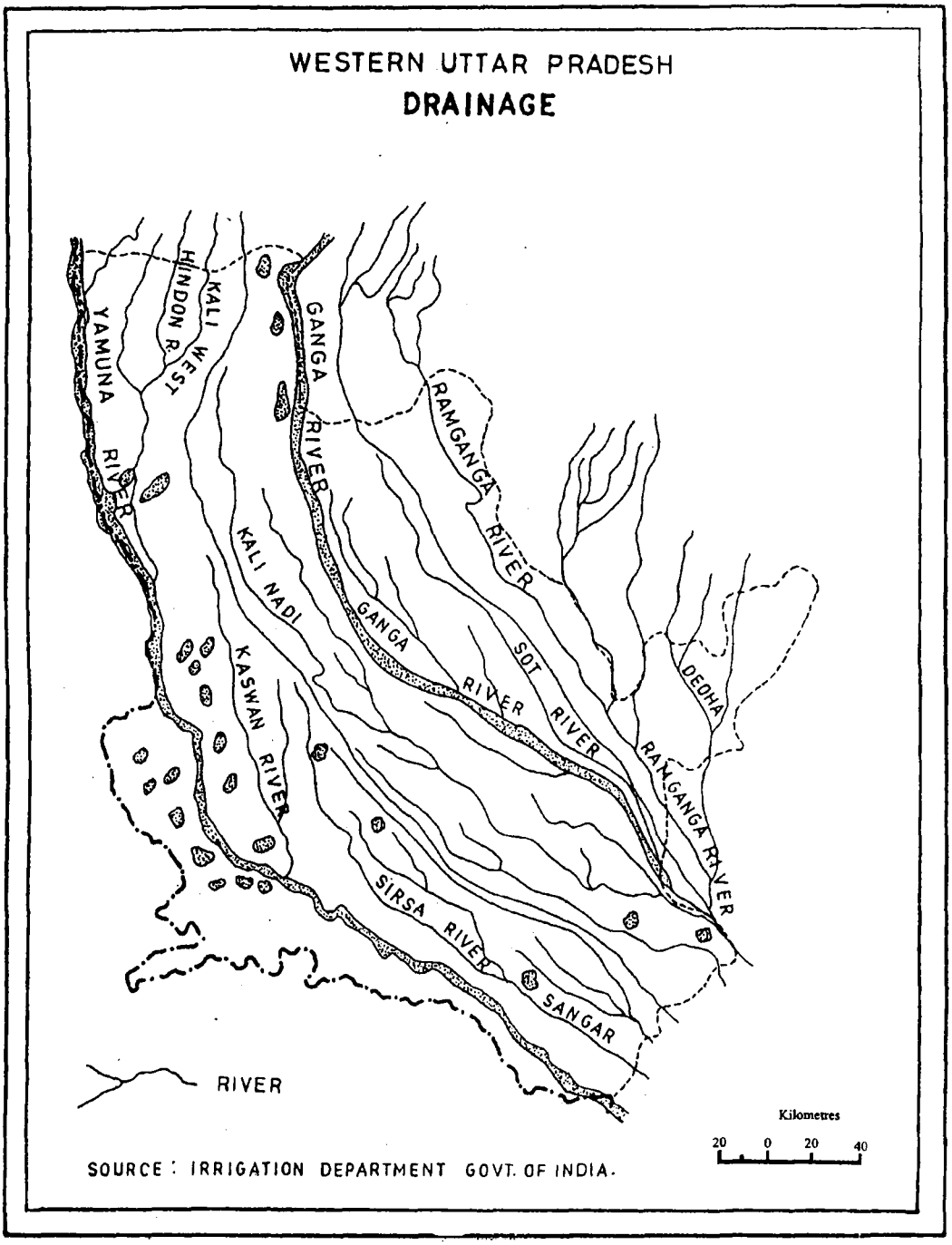

WESTERN UTTAR PRADESH
DRAINAGE
YAMUNA RIVER
HINDON R.
KALI WEST
GANGA RIVER
RAMGANGA RIVER
KALI NADI
GANGA RIVER
SOT RIVER
DEOHA
RAMGANGA RIVER
KASWAN RIVER
SIRSA RIVER
SANGAR
RIVER
Kilometres
20 0 20 40
SOURCE : IRRIGATION DEPARTMENT GOVT. OF INDIA.

FIG. 2.2

Muzaffarnagar district; the river enters the district of Meerut and separates it from the districts of Bijnor and Moradabad.

Later on, it forms the eastern boundary of the districts of Bulandshahar, Aligarh, Etah and Farrukhabad and also separates Moradabad, Budaun and Shahjahanpur district to its eastern side. The important tributaries joining the Ganga in Western Uttar Pradesh are the Yamuna, Ramganga, Kali Nadi, Nium Nadi, Isan Nadi, Tista Burdanar, Chhoiya, Bhain Saur and sot.

2.2 THE YAMUNA:

The Yamuna, second major river rises from Yamnutri at a height of 6216.9 meters. Generally it flows in south; south-east direction. The course of river Yamuna is quite irregular. The Hindan nadi joins the river Yamuna near Dadri in Gautam Budha Nagar district. The main tributaries of the Yamuna are Hindan, Karwan, Rind, Chambal, Senger, Sirsa and Utangan. Most of these tributaries are seasonal.

2.2.3 THE RAMGANGA:

The Ramganga, a perennial river coming out from the Himalayas and has well defined course, yet the area under its course is liable to continuous change owing to shifting of river bed. The surface of the land where it flows is subjected to annual inundation and deposition of fine sand and silt similar in character to that of the Ganga River. The eastern low land of Budaun district consists of numerous lakes, water channels, marshes and other land depressions which all are the vestiges of ancient bed of the Ganga river and are now locally known as "*Bankati*" in the Budaun and Shahjahanpur districts (Siddiqui, 1950). The tributaries of Ramganga are Kadwara, Bhicha, Rapi, Dhela, Kosi, Dhando, Rajherra, Narhar and the Bhagul.

2.3 GROUND WATER:

The occurrence and distribution of ground water depends upon the characteristics of the underground formations of the alluvial plain of western Uttar Pradesh. The underground aquifers are supplemented from the rain water which sinks easily into the ground. The percolation from the major rivers, their tributaries, canals, field-channels, ponds and tanks also contribute to maintain ground water level.

A close examination of area under concern reveals that the water contours vary according to geological structure, relief, drainage, edaphic and climatic conditions and in general it follows a trend of south-east direction corresponding to the surface slope. The northern parts of western Uttar Pradesh is located in the Tarai Belt. The water table of the region lies within a range of 5 meters in summer season but, considerably, the level rises up during rainy season. The range of water table in the central Ganga plain region varies in depth from 5 to 10 metres, but, in the inter fluvial tracts of the Ganga and the Yamuna rivers, it may be up to 15 to 20 meters in depth (Fig. 2.3).

In the canal command area the water tables found at a depth of less than 2 metres because of the influence of seepage from water channels.

2.4 CLIMATE:

Variation in temperature and rainfall are the dominant factors which define the climate of the area under study. The region normally represents sub-humid climate bordered by dry plains of Punjab in the west and wet plains of eastern Uttar Pradesh in the east. The average weather condition resulting from combined effect of various weather controlling elements lead to distinguish four well marked seasons although micro-level diversities may sometimes be induced by the proximity of great Himalaya.

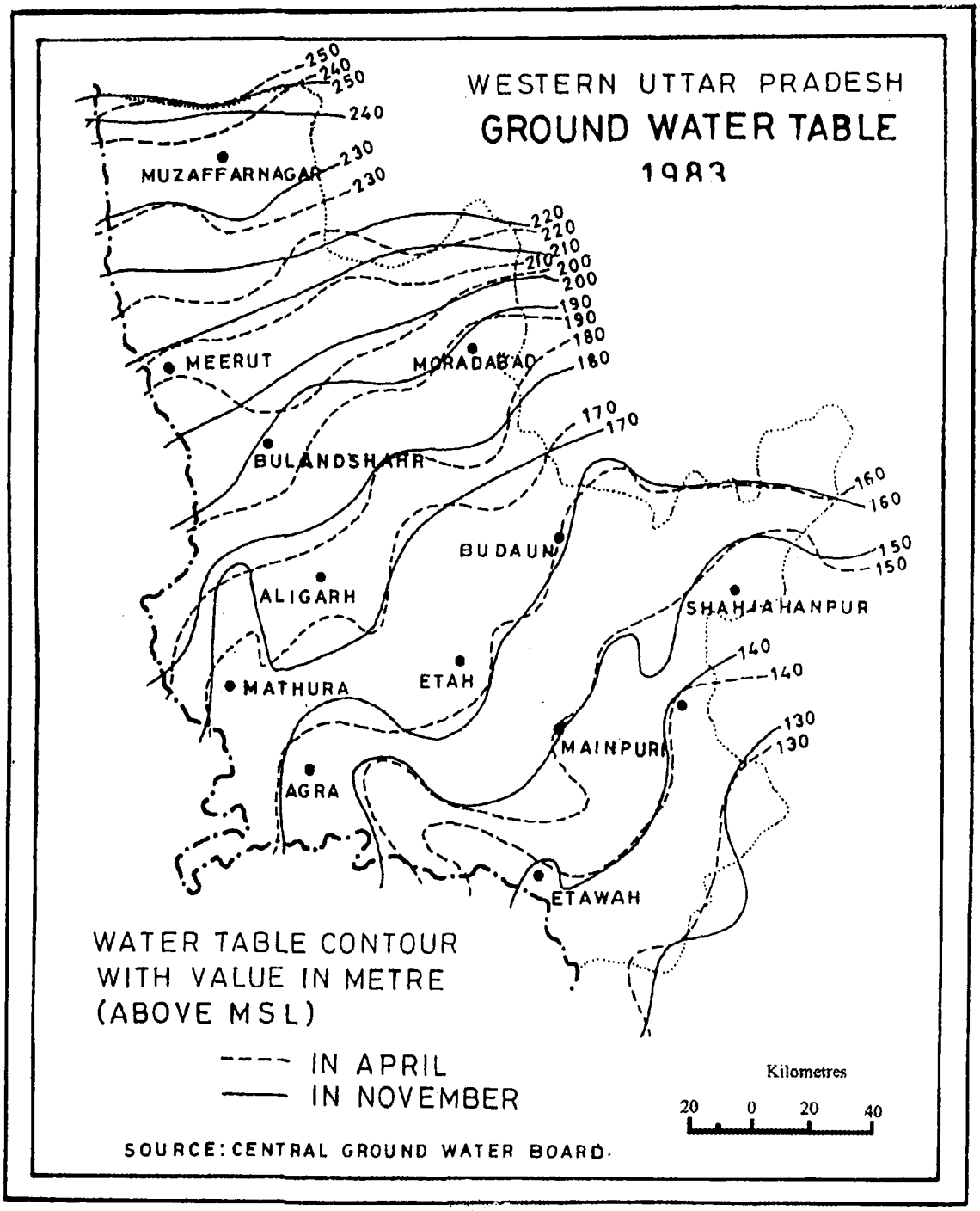

WESTERN UTTAR PRADESH
GROUND WATER TABLE
1983
MUZAFFARNAGAR
MEERUT
MORADABAD
BULANDSHAHR
ALIGARH
BUDAUN
SHAHJAHANPUR
MATHURA
ETAH
MAINPURI
AGRA
ETAWAH
250
240
230
220
210
200
190
180
170
160
150
140
130
WATER TABLE CONTOUR
WITH VALUE IN METRE
(ABOVE MSL)
IN APRIL
IN NOVEMBER
Kilometres
20 0 20 40
SOURCE: CENTRAL GROUND WATER BOARD.

FIG. 2.3

i. Hot summer

ii. Wet summer

iii. Pre-winter transition and

iv. Winter

Due to proximity of the Himalayan belt, particularly, the north-eastern part receives considerable amount of rainfall, where as some times south-western part suffers scarcity of rain. Differential heating of the lower atmosphere causes local precipitation followed by instantaneous heavy down pour.

In winter season, at the beginning of January light shower accompanied by normal size hail storms and thunder storms occurred frequently due to instability of atmospheric circulation. Gradual rise of temperature starts from February and continues till June (month of maximum Temperature 40° C) unless checked by incursion of more humid easterlies. The maximum temperature is recorded in upper *doab* near Meerut whereas further south including Aligarh and Mainpuri, slight increase in temperature has been noted. The temperature becomes high when crosses the limit and approaching towards south near Agra. This lateral thermal variation within the area is attributed to the existence of the Himalayas (Shafi, 1968).

Deficiency in relative humidly produces a hot wave effect with the advent of summer season to which a term "*Loo*" has been assigned. The arrival of south-west monsoon is experienced with increasing heating effect in the region in the later half of the summer. Relative humidity remains over 70 percent throughout the rainy season except for June when it is around 50 percent. The intensity of monsoonal rainfall decreases towards westward and southward. Monsoon in this region starts from Bay of Bengal and moves towards the Himalayan zone along a barometric slope. While passing over the western Uttar Pradesh, they have lost their significant amount of moisture causes a slight variation in amount of rainfall.

A sudden fall in temperature by the end of October, the rain coming down to below 10 centimetre. In October gradual decline in temperature causes severe cold in the month of December. The occurrence of dry and chilly westerlies followed by western disturbances associated with cold waves. In the north-west, the significant features of cold seasons are frost night in January; hail storm in February and March which tends to damage most of the standing crops particularly sugarcane (Tikka, 1961).

Average temperature is lowest in January (below 20°C) and decreases toward west and north-west side of the region. The average rainfall in the area varies between 50 cm to 120 cm whose spatial and temporal distribution is irregular.

2.5 SOILS:

The soils of western Uttar Pradesh are of alluvial origin. These soils have resulted from the deposition of the silt brought by the rivers and tributaries of the Ganga system. They cover an area of 450,000 sq km. in the Indo-Gangetic plain (Fig. 2.4). Generally, the soils of the region are uniform and similar in their characteristic. The soils of the region can be classified into three groups.

i) The *Khadar* or newer alluvium
ii) The *Bhangar* or older alluvium and
iii) The Soil of Tarai Tract (Spate, 1967)

i) **The *Khadar* or newer alluvium:** It is limited in extent and strictly confined to the terraces and the flood plains of the big rivers i.e., the Ganga, the Yamuna, the Ramganga and their tributaries. It makes a narrow strip along both sides of the main rivers and is always exposed to floods and water-logging. Its water retention capacity is very poor. The colour of the soil varies from light grey to ash grey and the texture is sandy to silty loam. The *Khadar* tract is quite negligible in sandy tract (Fig. 2.5).

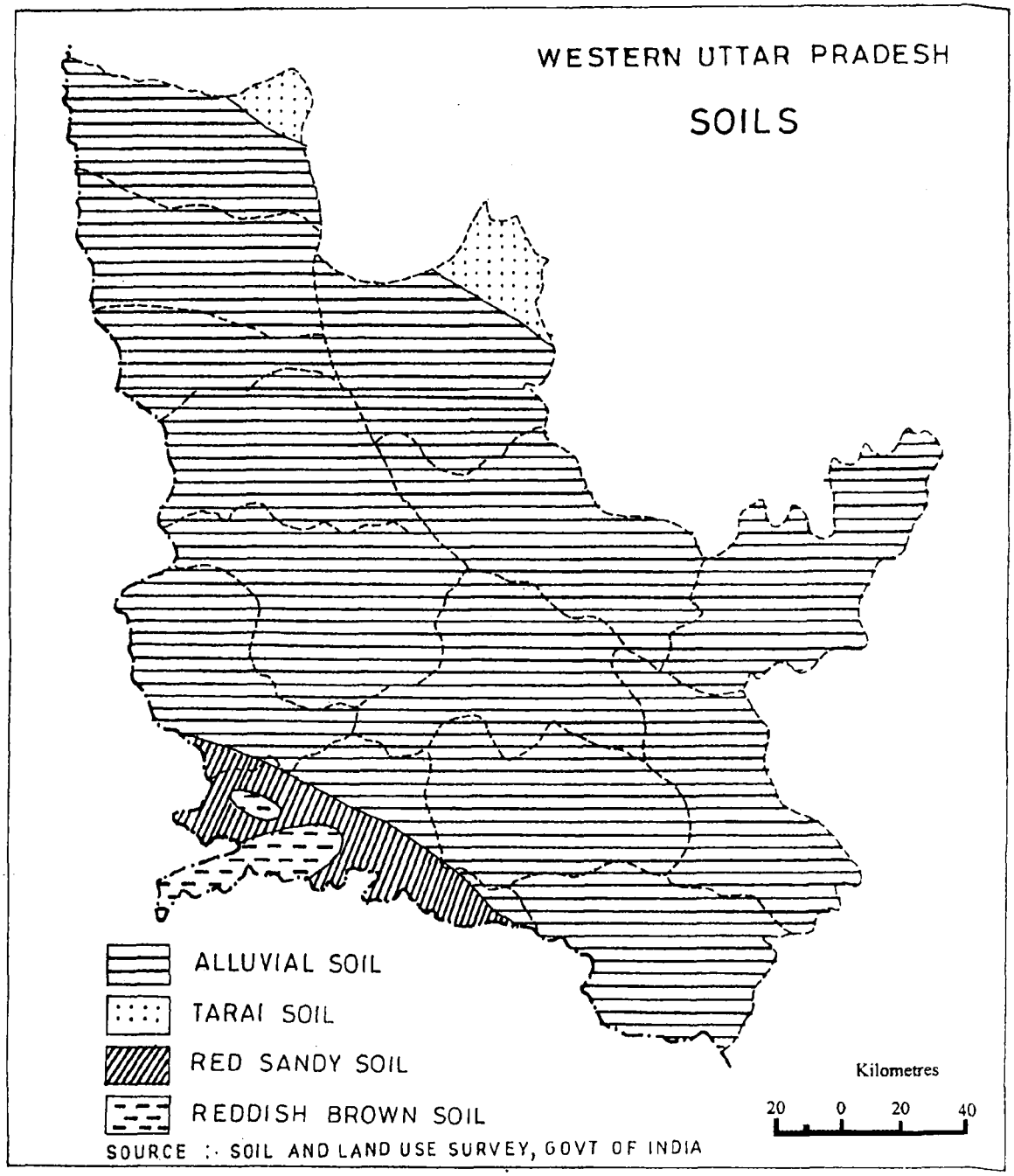

WESTERN UTTAR PRADESH
SOILS
ALLUVIAL SOIL
TARAI SOIL
RED SANDY SOIL
REDDISH BROWN SOIL
Kilometres
20 0 20 40
SOURCE :- SOIL AND LAND USE SURVEY, GOVT OF INDIA

FIG. 2.4

ii) ***Bhangar* or older alluvium:** It is more extensive in areal spread, occupying the interfluvial zones. The most important material in *bhangar* is clay at some places it become loam or sandy loam. This soil generally contains kankar and is of darker in colour. On the basis of texture, the *bhangar* soils have been further sub-divided into sandy, sandy loam and alkaline soils. Its sandy ridges with a flat topped and gentle lateral slopes extends upto the Moradabad district from north west to south east and are roughly parallel to the Ganga river. The soil has covered a region stretches upto district Budaun. The low humus content in soil is due to its several stages of oxidation (Gerassim, 1958). Sandy loams soils till recent time occupy a considerable large portion of well drained Ganga plain. The tract comprising sandy loam soils stretches in elongated strips along the main rivers and runs across the vicinity of *Khadar* lands (Spate, 1957). The greatest width of this tract is seen in Aligarh, Agra and Mathura districts. The sandy loam tract is rather broad in the upper parts of Muzaffarnagar, Meerut, Bulandshahr and in Aligarh districtS. It is interspersed by long patches of good quality loam, chiefly, in Etah and Farrukhabad districts. The most important characteristics of this soil is it homogeneity and level topography throughout the region. The texture of this soil is predominantly sandy and the colour ranges from yellow brown to reddish brown. It contains humus but in lesser amount than loamy soils and its water holding capacity is low.

Loamy soil lies in discontinuous patches. It is rich in humus and organic matter and water retention capacity is comparatively high. This soil is locally known by different names such as *matiyar, domat* and *kalihar*. One elongated patch of loamy soils runs more or less parallel to the *kali nadi* passing through Aligarh, Etah and Farrukhabad districts. Another important tract of this soil runs through Mathura and Agra. Third tract runs through Moradabad and Budaun districts. It also covers a considerable area in Shahjahanpur district. The colour ranges from light grey to brownish grey.

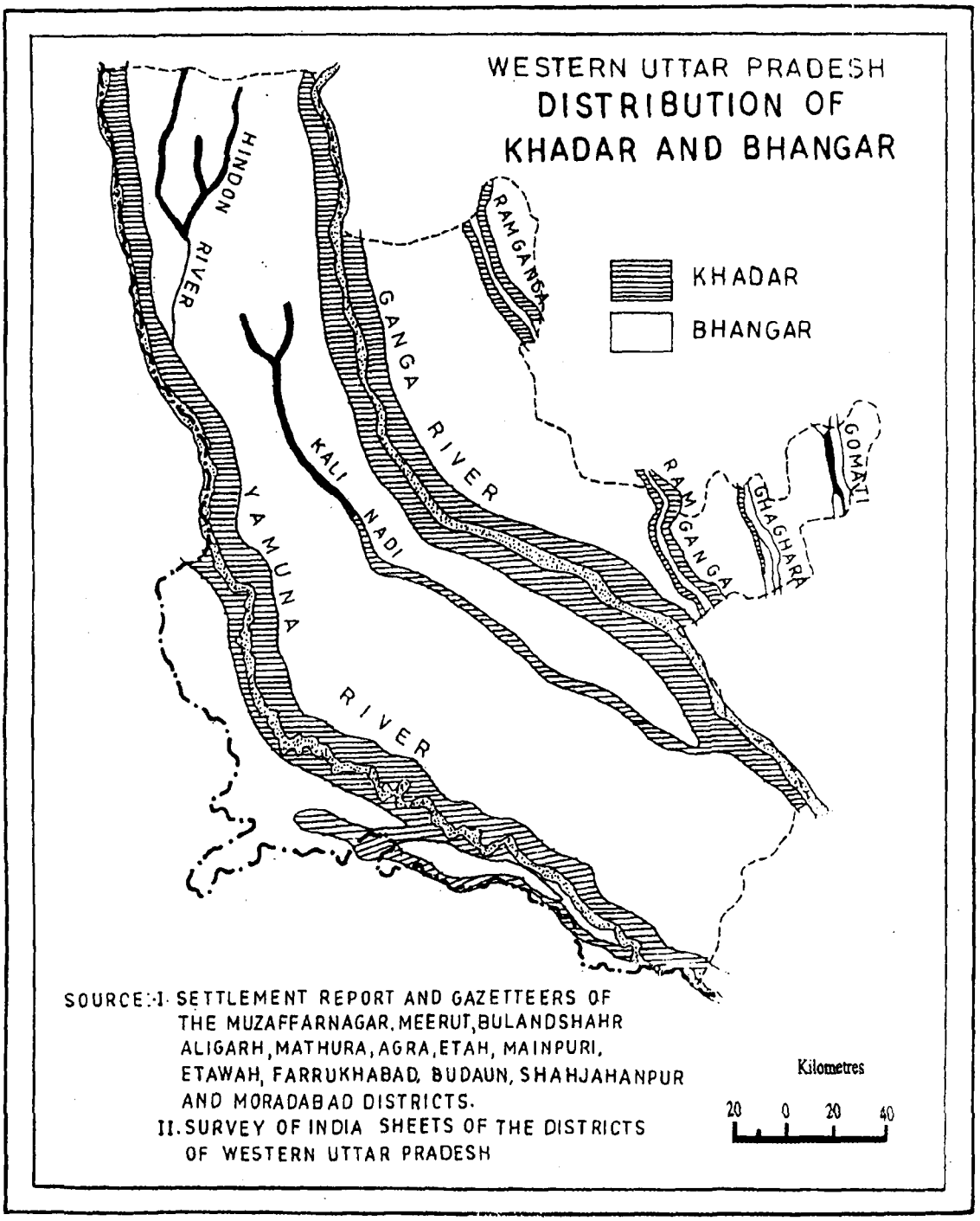

WESTERN UTTAR PRADESH
DISTRIBUTION OF
KHADAR AND BHANGAR
KHADAR
BHANGAR
HINDON RIVER
GANGA RIVER
RAMGANGA
KALI NADI
YAMUNA RIVER
RAMGANGA
GHAGHARA
GOMATI
SOURCE:-I. SETTLEMENT REPORT AND GAZETTEERS OF THE MUZAFFARNAGAR, MEERUT, BULANDSHAHR ALIGARH, MATHURA, AGRA, ETAH, MAINPURI, ETAWAH, FARRUKHABAD, BUDAUN, SHAHJAHANPUR AND MORADABAD DISTRICTS.
II. SURVEY OF INDIA SHEETS OF THE DISTRICTS OF WESTERN UTTAR PRADESH
Kilometres
20 0 20 40

FIG. 2.5

Clay loam soils occur in low lying areas where hills and swamps are common features and the drainage is very much restricted. One track of this soil is found between the Rina and Senger nadi, another in the north-west and west of the Ramganga river in Budaun, Shahjahanpur and Moradabad districts. It is also found in the western most parts of Mathura and Agra districts.

Silty loam soil is slightly different from the loamy soil. It is more fertile and dispersed and found in upper interfluvial plain of Ganga Yamuna *doab*.

The saline and alkaline soils popularly known as *reh*, *usar* or *Thur* are scattered and found in vast stretches. It is distributed, in the low lying and ill-drained areas. More or less it is found in every district but it covers vast areas in the districts of Aligarh, Mainpuri and Etawah.

iii) **Tarai Soils:** It covers a small area in Moradabad district. The texture varies from clay to sandy loam. The upper layer of the soil is rich in organic material as well as in nitrogen content.

A general view of the area under consideration suggests that most of the eastern and northern parts of western Uttar Pradesh are occupied by good quality of soil where as the districts, occupying the southern and south-western part of the west Uttar Pradesh are deficient in fertile soil. In general, the region as a hole is suitable for cropping pattern. At the same time, there are marked regional variations in soil characteristics. Spatial variation in soil is due to a set of geographical factors such as climate, parent rock and composition and structure of the rocks

2.6 SOCIO ECONOMIC PROFILE:

Uttar Pradesh is a land locked state, mainly rural with an economy that is primarily agrarian. Nearly 75 percent population of western Uttar Pradesh live in rural areas. Agriculture and allied activities employ 58.62 percent of

work force. Nearly 15.12 percent of workers are employed in the secondary sector and 26.26 percent in the tertiary sector (Census of India 2001).

In 2002-03, there were 72 junior basic schools and seven higher secondary schools per lakh population in western Uttar Pradesh, whereas the corresponding number of allopathic hospitals and dispensaries per lakh of population were 2.77 in western Uttar Pradesh and 2.82 in Uttar Pradesh as a whole. In the same period, the number of hospital beds per lakh of population were 38.73 and 41.16 in western Uttar Pradesh and Uttar Pradesh respectively (Statistical abstract U.P,, 2003).

2.6.1 ECONOMY:

Since the economy of the region is predominantly agrarian and performance of agriculture and allied activities, animal husbandry, dairying and fisheries are critical in determining the growth rate of the region. The primary sector (inclusive of mining) contributed 36.8% to the Uttar Pradesh's income in 2003-204 and provided employment to 66% of total workers. However, the share of this sector in state income has been progressively reducing.

The net state domestic product of Uttar Pradesh in 2001 was about 9 percent of India's total national domestic product. Per capita national domestic product was 57700 rupees, roughly 40 percent below the average per capita national domestic product of 9508 rupees for the same year.

2.6.2 AGRICULTURE SCENARIO:

About 80 percent of the people in the region live in the rural areas; and 66% are dependent on agriculture for their livelihood. Agriculture accounts for 38% of gross state domestic product (2001-02). The main agricultural crops in the state are wheat, rice, sugarcane and pulses.

Green revolution had a tremendous impact on agricultural development in western Uttar Pradesh, with its favourable soil and climatic conditions and

well developed irrigation facilities. The cropping intensity is 158.49 in the region in 2001-02 (Statistical abstract U.P., 2003; P. 81).

The agricultural products contribute significantly to several agro-based industries such as sugar, oil crushing, grain milling and food processing by providing raw materials. The region has fertile soils and water availability through river flow and rainfall. It is also honoured by favourable sunshine and wind. At all India level the present investment in the agriculture sector is only 1.3% of the total gross domestic product (GDP), the position is not much better at the state level either.

2.6.3 INDUSTRY:

The industrialization pattern in Uttar Pradesh is highly skewed with the western region of the state accounting for most of the industries of the state. The main industries in the region are cement, vegetable oils, textiles, cotton yearn, sugar, jute and carpet.

Even the industrial distribution in the region is not uniform. The region has fairly large and diversified industrial base. There are 12.2 registered industrial units per lakh population in the region according to 2001 census. The industrial base of western Uttar Pradesh mainly consists light engineering and agro-based industries.

Table 2.1:District wise distribution of literacy by sex in western Uttar Pradesh 2001.

Districts	Persons	Males	Females
Shaharanpur	61.22	70.91	50.00
Muzafffarnagar	60.67	71.91	47.81
Meerut	64.79	75.00	53.12
Baghpat	64.24	76.99	49.17
Bulandshahar	59.39	74.31	42.48
Ghaziabad	69.74	79.84	85.01
Gautam Budha Nagar	68.69	81.26	53.70
Aligarh	58.48	71.71	43.03
Hathres	62.49	76.28	46.31
Mathura	61.46	76.47	43.43
Agra	62.60	74.60	48.35
Firozabad	64.48	75.89	50.95
Mainpuri	65.09	76.70	51.41
Etah	54.63	67.52	39.26
Bareilly	47.84	58.73	35.22
Budaun	38.17	48.96	25.14
Shahjahan pur	49.09	59.73	36.25
Pilibhit	49.81	62.49	35.11
Bijnoor	58.08	68.78	46.10
Moradabad	44.75	54.91	33.01
Jyotibafule Nagar	49.47	62.59	34.56
Rampur	38.76	48.20	27.89
Farrukhabad	60.89	71.14	48.65
Etawah	69.57	79.92	57.38

Source: census of India, 2001

Production of western Uttar Pradesh is Rs. 7, 042. The average number of workers in the registered factories per lakh of population in western Uttar Pradesh is 389 only. The industrial backwardness of the state is reflected by the fact that per capita consumption of electricity is as low as 190.4 killo watt hrs. To look in a growth trajectory of industry as a whole, the growth paths of economy all over the world indicate that manufacturing is more likely to show better growth prospects over time.

2.6.4 EDUCATION:

Western Uttar Pradesh does not fare much better in terms of education. Literacy levels in the study region continue to be abysmally low as nearly 58.3 percent of population above seven years of age is literate in western Uttar Pradesh against the national average of 64.8 percent. Moreover, the average literacy rate conceals serious variations in the levels of literacy among social groups and regions. At the regional level the percentage of literacy distinctly higher in the north west district (Table 2.1). Taking in view, Uttar Pradesh as a whole, merely 57 percent of the population was literate in 2001 (census of India 2001). Further, literacy rates were higher in urban areas than in rural ones, at about 71 percent versus 54 percent. Women are less literate than men. Differences in literacy rates can also be seen between and within scheduled castes and scheduled tribes (SC & ST).

2.6.5 DEMOGRAPHY:

Uttar Pradesh with a population of 16.6 million is the most populous state of the Indian union accounting for 16.17% of the union's population. The rapid growing population in the region is a matter of great concern. The population of western Uttar Pradesh increased from 49.43 million in 1991 to 61.20 million in 2001 comprising of 32.86 million (53.69 percent) males and 28.34 million (46.31 percent) females.

Table 2.2 District wise decadal growth rate, sex ratio and population density in western Uttar Pradesh, 2001.

Districts	Growth Rates	Sex ratio	Population Density
Shaharanpur	25.46	865	785
Muzafffarnagar	24.63	871	884
Meerut	23.96	872	1157
Baghpat	13.01	847	881
Bulandshahar	21.79	879	669
Ghaziabad	47.49	860	866
Gautam Budha Nagar	36.91	841	834
Aligarh	22.13	862	820
Hathres	18.55	858	726
Mathura	27.27	840	621
Agra	31.60	846	899
Firozabad	33.92	852	870
Mainpuri	21.79	857	579
Etah	24.29	849	628
Bareilly	27.64	871	878
Budaun	25.39	842	594
Shahjahan pur	28.23	842	557
Pilibhit	28.23	877	470
Bijnoor	27.20	896	687
Moradabad	28.53	875	1025
Jyotibafule Nagar	29.68	885	667
Rampur	28.08	879	813
Farrukhabad	22.31	848	720
Etawah	21.49	858	579

Source: census of Indian 2001

Considerable variations in growth rate at district level are observed. Generally growth rates were higher in the western region. The districts which have shown an increase of over 30 percent in population during the decade of 1991-01 are Ghaziabad, Gautam Budha Nagar and Firozabad. The migration from rural centres to urban centres is one of the reasons behind increase in multifold population.

Along with a low life expectancy for women another indicator of gender disparity in the state is the low sex ratio. India's sex ratio is among the lowest in the world and Uttar Pradesh's sex ratio in this context is strikingly low. The situation is worrisome in this respect, as the sex ratio in western Uttar Pradesh is 826 which is well below the figure of 898 for the state as a whole (Table 2.2). On this front the situation is better in eastern and central regions and it is lowest in the districts of western region. The lowest sex ratio is reported from the districts of Baghpat, Gautam Budha Nagar, Budaun and Shahjahanpur.

High fertility rates, coupled with high maternal mortality rates negatively affect chances of female survival during child bearing years and these factors taken together affect female life expectancy and in turn, the sex-ratio which reflects tangible anti-female discrimination in the region.

2.6.6 Urbanization

The state Uttar Pradesh is primarily rural, with an urbanization rate of about 21 percent in 2001. As we know the degree of urbanization plays a crucial role in the process of economic developments. It is high in the region as compare to other parts of the state. The region has 28.3 percent level of urbanization as compare to the figure of 20.82 percent for Uttar Pradesh as a whole. On the other hand the rate of Urbanization for India is 27.80 percent. Even, there is marked variability in the degree of urbanization among the

districts. In the light of on going discussion, it is clear that the western Uttar Pradesh is the most urbanized region of the state. The rate of urbanization

above 40 percent has been reported from the districts of Meerut, Ghaziabad and Agra. Etah, Mainpuri and Pilibhit have been recorded a rate of urbanization below 20 percent (Census of India, 2001).

2.6.7 INFRASTRUCTURE:

In 2002, Uttar Pradesh had a total of 248, 481 Km. of roads of which 67 percent were surfaced. There is a dramatic increase in the proportion of surfaced to un-surfaced road in 1998, which was about 44 percent. At the same time though the total road network in Uttar Pradesh actually decreased by 11 percent between 1998 and 2002 and the increase in surfaced roads between those years was about 6 percent.

Electricity consumption per capita in 2002-03 was only 175.00 Kw. In terms of water and sanitation about 33 percent of households in Uttar Pradesh had access to safe drinking water, the same at the all India average.

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Chapter -3

Changing growth pattern of Major Crops

The dynamism in production, area and yield of the crops is a reflection of agricultural growth in a given region; it would be worth while to examine their relative position with respect to area, production and yield. An attempt has been made to examine the relative changes in the levels of area, production and yield per hectare of the selected crops at district level.

The increase in area under wheat varies between the value of 0.29 percent in Mathura and 2.62 percent per annum in Agra district. Besides these two extreme variations, seven districts namely, Firozabad, Bareilly, Pilibhit, Rampur, Shajahanpur, Budaun and Mathura account for a growth trend of less than 1 percent per annum (Tale 3.1 and Fig. 3.1(a)). The declining trend in area is more pronounced in the districts of Farrukhabad (-4.91 percent), Meerut (-4.90 percent), Etawah (-4.35 percent), Moradabad (-3.30 percent), Baghpat (-2.71 percent), Hathras (-1.81 percent) Bulandshahar (-1.43 percent), Ghaziabad (-1.31 percent) and Muzaffarnagar (-1.23 percent per annum). There are five districts namely, Saharanpur, Gautam Budha Nagar, Aligarh, Mainpuri and Bijnor where the downwards trend is less than -1 percent per annum.

The trends of growth in the production of wheat are maintained by thirteen districts. The trends of growth vary from 0.08 percent in Bijnor to 3.87 percent per annum in Agra. Among these nine districts namely agra, Etah, Bareilly, Shahjahanpur, Pilibhit, Budaun. Firozabad, Mathura and Hathras show a growth trend more than 1 percent per annum (Table 3.1 & Fig. 3.1 (b)). The downward trend is pronounced in the remaining eleven districts and varies between -0.41 percent in Muzaffarnagar and -4.50 percent in Meerut.

The growth trends of area under barley are rather discouraging in twenty four districts, only three districts show an upwards trends, namely Rampur, Saharanpur and Agra with a growth trend of 4.48 percent, 3.35 percent and 0.07 percent per annum respectively (Table 3.2 & Fig 3.2 (a)). The downward trend is followed in the remaining twenty one districts varying from -0.05 percent in Meerut to -7.22 percent per annum in Bijnor district.

Table 3.1: District wise, Area and Production of Wheat during Trienniums 1992-95 & 2002 -2005

Districts	Area (in Hectare)		Change	Annual growth (in %)	Production (In tonnes)		Change	Annual growth (in %)
	1992-95	2002-05			1992-95	2002-05		
Saharanpur	129811	117845	-11966	-0.921	346203.3	331251.66	-14951.64	-0.431
Muzaffarnagar	143224	125473	-17751	-1.239	440677.7	422419.66	-18258.04	-0.414
Meerut	150344.3	76633	-73711.3	-4.902	511867.3	281420	-230447.3	-4.502
Bagpat	76392	55638	-20754	-2.716	281352	201211	-80141	-2.848
Bulandshahar	209527.3	179424.66	-30102.64	-1.436	731713	653732.33	-77980.67	-1.065
Ghaziabad	98872.33	85821.33	-13051	-1.319	336245.7	302211.66	-34034.04	-1.012
Gautam Budha Nagar	75231.33	68319.66	-6911.67	-0.918	253160.40	221275.33	-31885.07	-1.259
Aligarh	236084.3	213239	-22845.3	-0.967	645989.3	682168	36178.7	0.560
Hathras	110352	90327.66	-200024.34	-1.814	257430.42	289536.66	32106.24	1.247
Mathura	183955.3	189326	5370.7	0.291	538894	629133.33	90239.33	1.674
Agra	102478.3	129367.33	26889.03	2.623	303981.3	421865.66	117884.36	3.878
Firozabad	94896	102883.66	7987.66	0.841	258716.7	302190.33	43473.63	1.680
Mainpuri	121670	116197.33	-5472.67	-0.449	327921.7	343044.66	15122.96	0.461
Etah	184251.3	209255.66	25004.36	1.357	458337.7	588863.33	130525.63	2.847
Bareilly	177494.3	190584.66	13090.36	0.737	398772	499654.66	100882.66	2.529
Budaun	276037.7	284408.66	8370.96	0.303	655750	776049.66	120299.66	1.834
Shajhanpur	237792.3	250663	12870.7	0.541	630021.3	796985	166963.7	2.650
Pilibhit	144243.3	153491.66	9248.36	0.641	368459	467490.33	99031.33	2.687
Bijnor	116938.7	111184	-5754.7	-0.492	300182	302782	2600	0.086
Moradabad	296057.7	198100.33	-97957.39	-3.308	775712	574247.66	-201464.34	-2.597
Jyotibafule Nagar	110592.30	94551.66	-16040.64	-1.450	287031	268027.66	-19003.34	-0.662
Rampur	124744.3	131075	63307.7	0.507	390548.3	418815.66	28267.36	0.723
Farrukhabad	143480	73010.33	-70469.67	-4.911	399201.7	228993.66	-170208.04	-4.263
Etawah	149259	84300	-64959	-4.352	423948.3	255368.33	-168579.97	-3.976

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

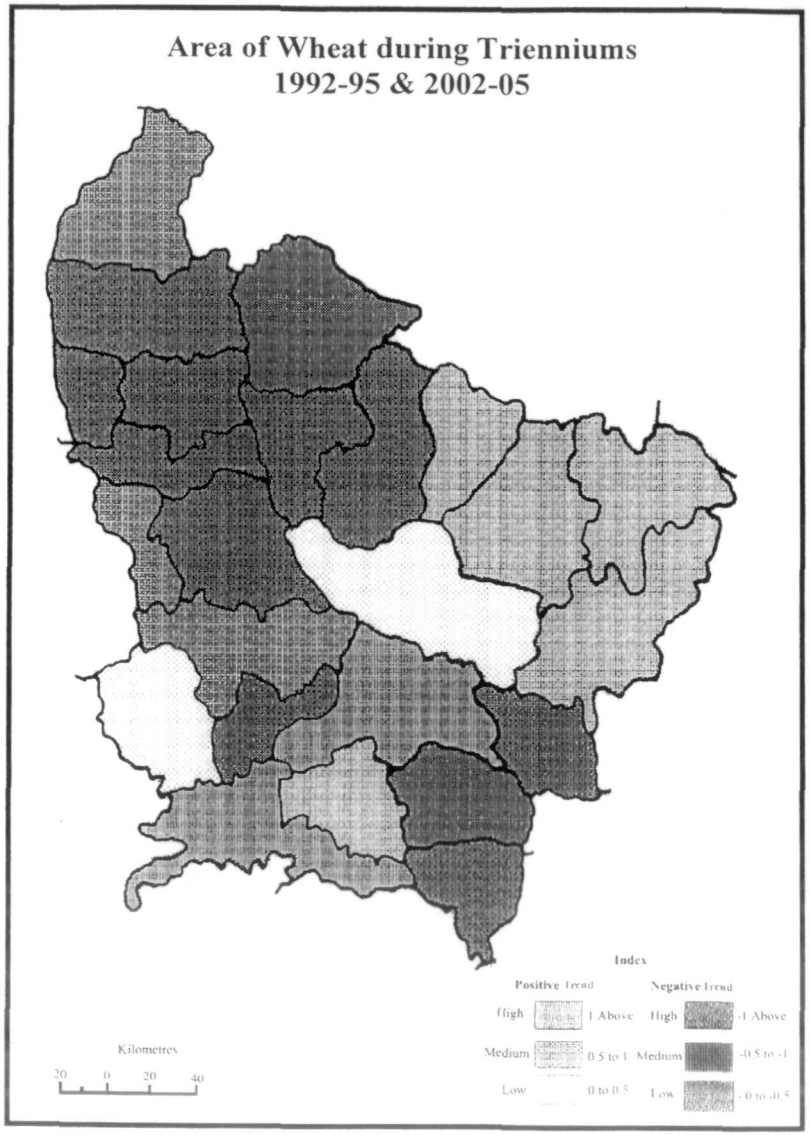

Fig 3.1 (a)

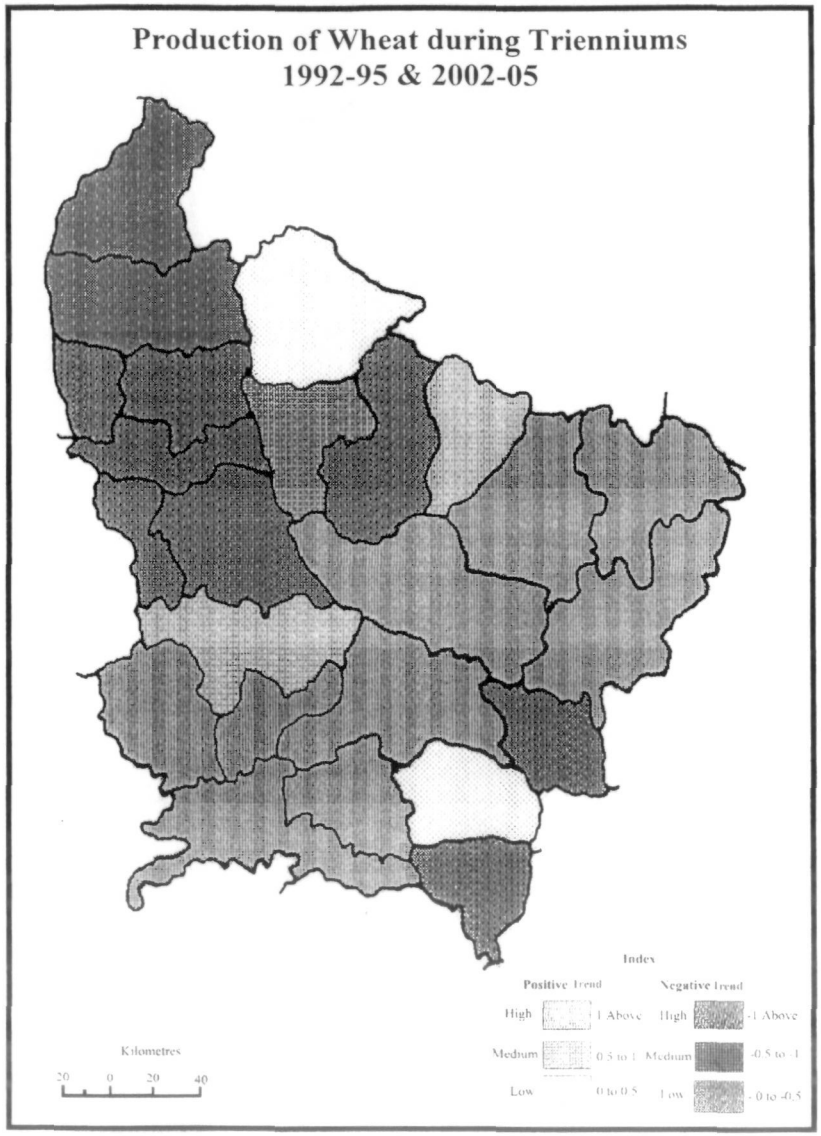

Fig 3.1 (b)

With regard to the trends in production of barley, the twenty three districts out of twenty four districts showing a down-ward trends. The district Agra alone with a 1.09 percent per annum growth rate has maintained it trend (Table 3.2 and Fig 3.2 (b)). In all twenty three districts the variation of downward trend ranges from -1.04 percent in Etah to -8.83 percent per annum in Bijnor. A sufficient number of districts are classed between -3 percent and -6 percent negative rate of trend per annum. Barley being a coarse grain does not show any appreciable trend of growth in terms of area and production. The decline in area is mainly due to the increase in area under other crops particularly wheat.

There are positive trends of growth in area and production under potatoes. Except ten districts of Saharanpur, Muzaffarnagar, Meerut, Baghpat, Shahjahanpur, Pilibhit, Moradabad, Jyotibafule Nagar, Farrukhabad and Etawah almost all the remaining fourteen districts have positive growth in area varying from 0.07 percent in Ghaziabad to 26.73 percent per annum in the district of Agra, although most of the districts have insignificant area under potatoes in the western Uttar Pradesh (Table 3.3 & Fig. 3.3 (a)). But the pattern of growth is more prominent specially in the districts of Firozabad (15.87 percent), Mathura (6.18 percent), Aligarh (4.14 percent) Hathras (5.42 percent), Bijnor (2.88 percent), Etah (2.06 percent) per annum. A group of districts namely, Farrukhabad, Baghpat, Meerut, Muzaffarnagar, Saharanpur Moradabad, Etawah, Jyotibafule Nagar indicate the negative trend of shift between the range of less than – 1percent and above than – 4 percent per annum.

The trends in production are marginal positive in a number of districts under potato cultivation, although the levels of production is comparatively low but a large number of districts registered the values of growth exceeding 2 percent per annum (Table 3.3 & fig 3.3 (b)).

Table 3.2: District Wise, Area and Production of Barley during Trienniums 1992-95 & 2002 -2005

District s	Area (in Hectare)		Change	Annual growth (in %)	Production (In tonnes)		Change	Annual growth (in %)
	1992-95	2002-05			1992-95	2002-05		
Saharanpur	69.66	93	2334	3.350	483	219.66	-263.34	-5.452
Muzaffarnagar	681.33	442.33	-239	-3.507	2397	1073.66	-1323.34	-5.520
Meerut	783.66	333	-450.66	-0.057	2753	951.33	-1801.34	-6.544
Bagpat	152.39	131.66	-20.73	-1.360	412.33	362.33	-50	-1.212
Bulandshahar	23710.33	9513	-14197.33	-5.987	77523	32424.33	-45098.67	-5.819
Ghaziabad	2948	1407.33	-1540.67	-5.266	9964	3954.66	-6009.34	-6.031
Gautam Budha Nagar	3092	2858	-234	-0.756	9152	8012	-1140	-1.245
Aligarh	37245.66	19528.66	-17717	-4.756	102206	65805.66	-36400.34	-3.561
Hathras	8773.60	6974.33	-1799.27	-2.050	31252	20145	-11107	-3.554
Mathura	17211	11467.66	-5743.34	-3.337	49207	31536.33	-17670.67	-3.591
Agra	10354.66	10433	78.34	0.075	26028	28883.33	2855.33	1.097
Firozabad	17574.66	10099.66	-7475	-4.253	47258	32201	-15057	-3.067
Mainpuri	6002.33	3835.33	-2167	-3.610	15934	11046.66	-4887.34	-3.067
Etah	17996.33	13798.66	-4197.67	-2.332	41466	37137.66	-4328.34	-1.044
Bareilly	412	158.33	-253.67	-6.157	1178	338.66	-839.34	-7.125
Budaun	2245.66	1229.33	-1016.33	-4.525	3946	2695.66	-1250.34	-3.168
Shajhanpur	1023	628	-395	-3.861	2223	1395.66	-827.34	-3.721
Pilibhit	46	41	-5	-1.086	219	86.33	-132.67	-6.057
Bijnor	116.66	32.33	-84.33	-7.228	636	74	-562	-8.836
Moradabad	626.66	283	-243.66	-5.483	1415	675.33	-739.67	-5.227
Jyotibafule Nagar	91.63	88.33	-3.3	-0.360	32	212.66	-139.34	-3.958
Rampur	26	37.66	11.66	4.484	196	89.66	-106.34	-5.425
Farrukhabad	3018.66	1507.33	-1511.33	-5.006	8872	4006	-4866	-5.484
Etawah	8515.66	3681.33	-4834.33	-5.676	25681	9525.66	-16155.34	-6.290

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

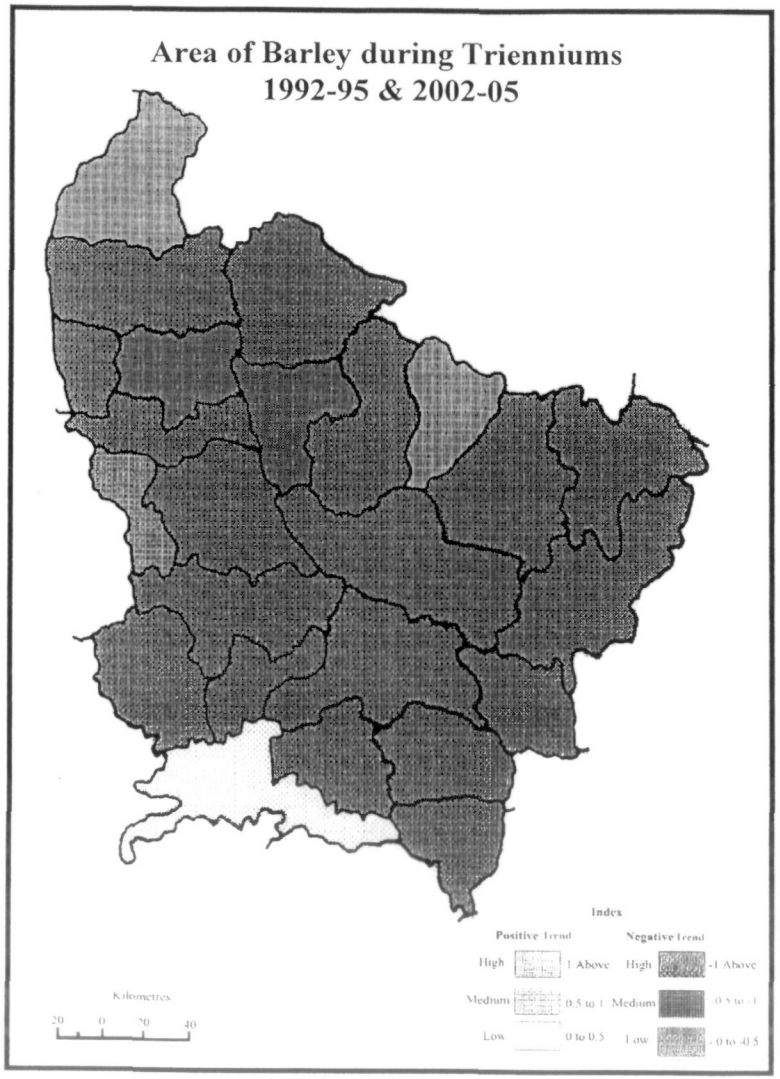

Fig.3.2(a)

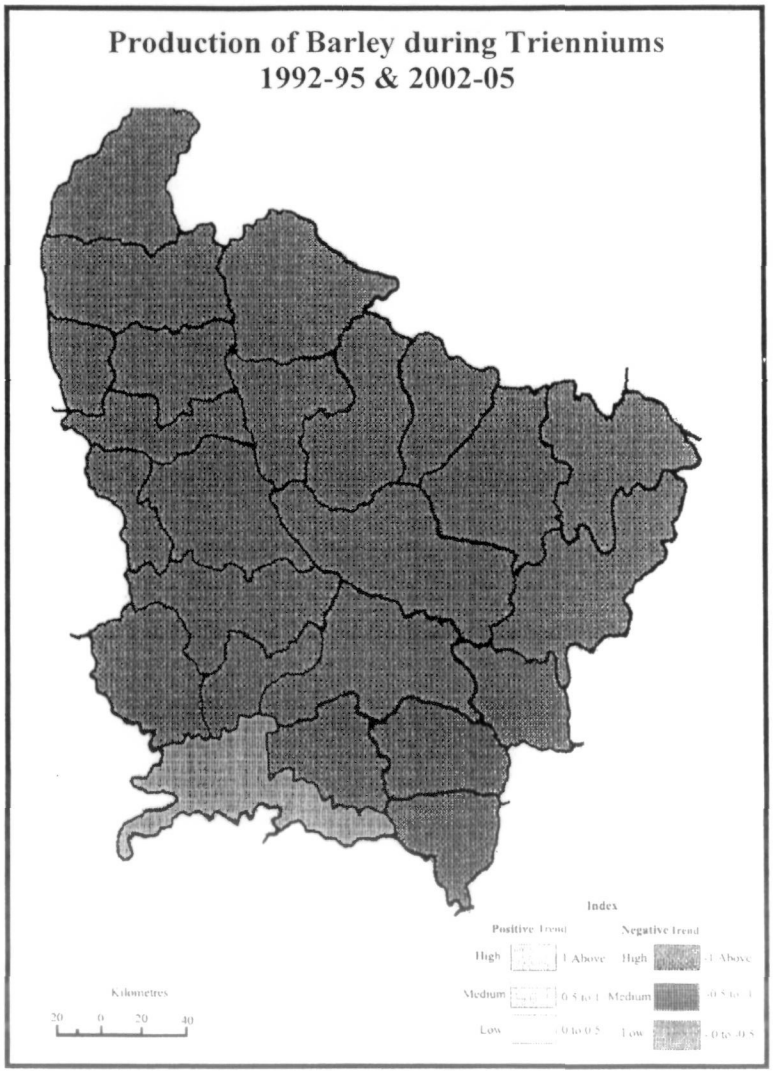

Fig.3.2 (b)

The districts of Agra, Firozabad, Bijnor, Etah and Aligarh with a growth rate of 32.48 percent, 16.85 percent, 10.09 percent, 8.28 percent and 8.12 percent per annum respectively recorded the highest growth rate. The remaining nine districts of the region recorded a growth trend less than 6 percent per annum. Out of twenty four districts, seven districts registered a negative trends of shift under production of potato ranging between -0.11 percent to less than -5 percent per annum.

Potato has entered into the diet of the people in a substantial way and the demand of Potato has considerably increased over the years and this explains the extension in area and production per hectare.

The trend of area under total cereal has rather deteriorated during trienniums 1992-95 & 2002-05 (Tab 3.4 & fig 3.4 (a)). There are only six districts namely, Agra, Firozabad, Shahjahanpur, Pilibhit, Bareilly and Rampur which indicate an upward trend. But among this, only one district of Agra has a trend of 2.42 Percent per annum indicating a marginal increase in area under it, and the rest five districts accounted trend value of less than 1 percent. The downward negative trend is more pronounced in the remaining eighteen districts and varies between -0.25 percent in Mainpuri and -5.40 percent per annum in Farrukhabad. These negative trends in area under total cereal might be due to an abrupt shift in area from cereal to other profitable cultivation of crops in the western Uttar Pradesh.

The trends of growth in the production of total cereal are maintained by thirteen districts (Tab 3.4 & Fig. 3.4(b)). The trends of growth vary from 0.096 percent in Aligarh to 7.33 percent per annum in Bulandshahr. Among these ten districts namely, Bulandshahr, Pilibhit, Mathura show a growth trend i.e., more than 1 percent per annum. Although eleven districts show a down ward trend in respect of production. The downward trend in growth in the remaining eleven

Table 3.3: District Wise, Area and Production of Potato during Trienniums 1992-95 & 2002 -2005

District s	Area (in Hectare)		Change	Annual growth (in %)	Production (In tonnes)		Change	Annual growth (in %)
	1992-95	2002-05			1992-95	2002-05		
Saharanpur	933	758.66	-174.34	-1.868	21960.33	14767.66	-7192.67	-3.275
Muzaffarnagar	3108	2394	-714	-2.297	72537	47320.66	-25216.34	-3.476
Meerut	8582	6286	-2296	-2.675	202873.33	153472	-49401.33	-2.435
Bagpat	432.60	328.66	-103.94	-2.402	8216.66	7365.66	-853	-1.038
Bulandshahar	5349.33	7260.66	1991.33	3.573	117713.33	142911.33	25198	2.140
Ghaziabad	5630.33	5673	42.67	0.075	136473	136204.66	-268.34	-0.019
Gautam Budha Nagar	298	339	41	1.375	9725.33	8175.66	-1549.67	-1.593
Aligarh	5859.66	8309.66	2450	4.141	113953	206512	92559	8.122
Hathras	19697.66	16498.33	5800.67	5.422	415901.66	513733.66	97832	2.352
Mathura	5588.66	9048	3459.34	6.175	120687.66	246885	126197.34	10.456
Agra	7980	29313.66	21333.66	26.733	187730	797491.33	609761.33	32.480
Firozabad	11260	29135.33	17875.33	15.875	265682.66	713457	447774.34	16.853
Mainpuri	11284.33	13445.33	2168	1.921	225869.66	310711.66	84842	3.756
Etah	8734.33	10533.66	1799.33	2.060	125694.33	229827.33	104133	8.284
Bareilly	5562.33	5667.66	105.33	0.189	79116.33	99523	20406.67	2.579
Budaun	17236	19922	2686	1.558	303708.33	449417	145708.67	4.797
Shajhanpur	6184	5924.33	-259.67	0.419	102504.33	125428	22923.67	2.236
Pilibhit	842.66	814	-28	-0.332	12282	17109.66	4827.66	3.930
Bijnor	767.66	989.33	221.67	2.887	13052.33	26228.66	13176.33	10.095
Moradabad	11472.66	9556.33	-1916.33	-1.671	199960.33	272053.33	72093	3.605
Jyotibafule Nagar	4132	3929	-203	-0.491	89578.33	79677.33	10099	1.451
Rampur	2786.66	2851	64.34	0.230	52924.66	82807.33	29882.67	5.646
Farrukhabad	55580.66	31249.33	-24331.33	-4.377	1042549.33	828482.66	-214066.67	-2.053
Etawah	9845	8995.33	-849.67	-0.863	168464.33	221938.66	53474.33	3.174

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

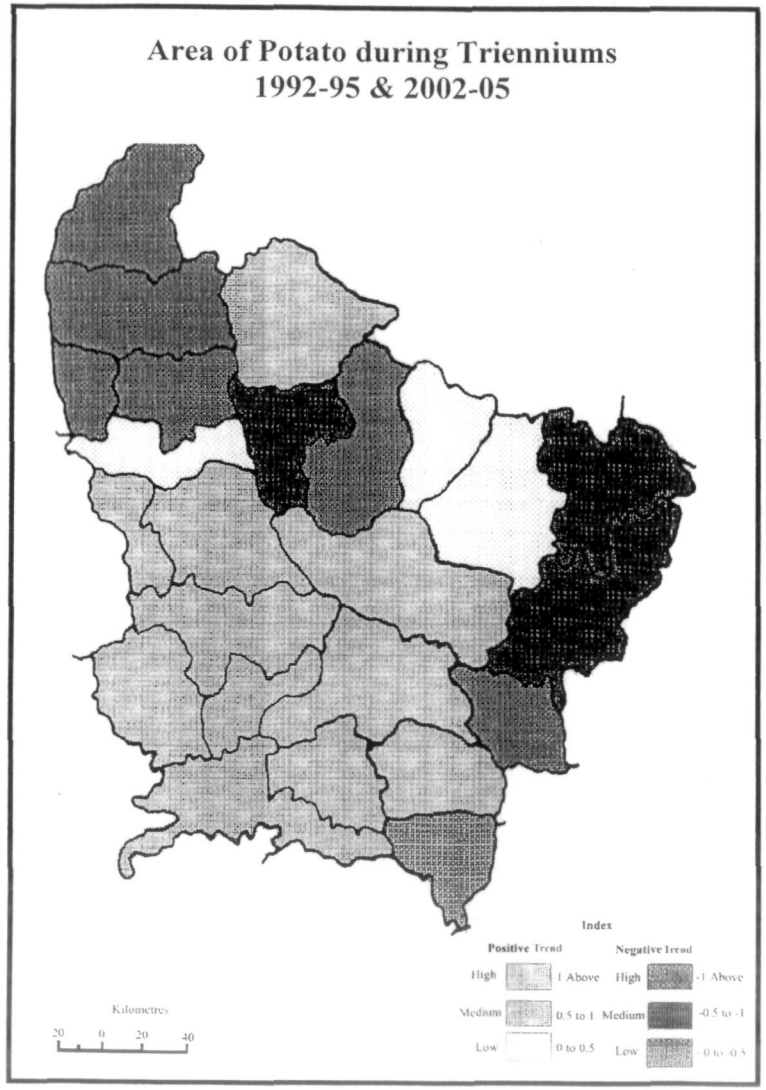

Fig.3.3 (a)

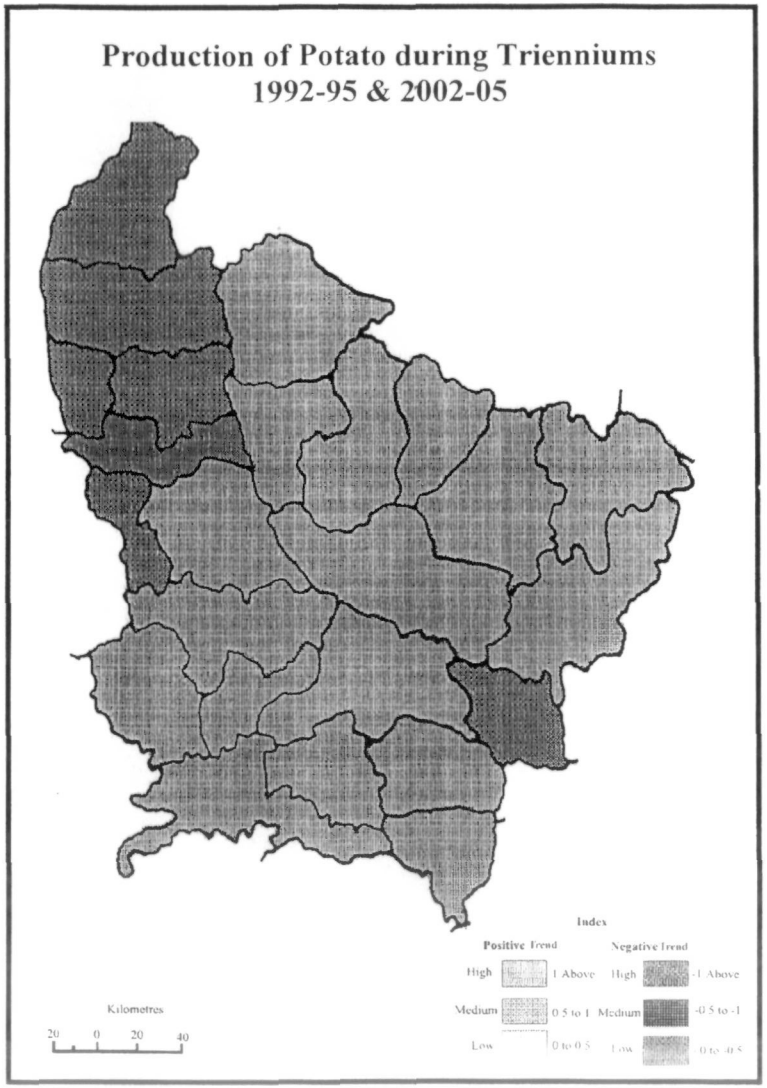

Fig.3.3 (b)

districts varies from – 0.70 percent in Bijnor to -5.40 percent per annum in Gautam Budha Nagar.

The trends in area under total pulses follow a downward direction to almost all the districts (Tab 3.5 & fig. 3.5 (a)). The districts of Moradabad, Budaun and Jyotibafule Nagar with a growth rate of 5.60 percent 3.36 percent and 1.36 percent per annum respectively, indicate an upward trend. The downward trend is more pronounced in the districts namely Farrukhabad, Etawah, Meerut, Bijnor, Shajahanpur, Mainpuri, Firozabad and Aligarh indicating more than 5 percent per annum. However in other districts the variations are -2 to -4 percent and in some cases less than -1 percent per annum.

In case of trends showing in production under total pulses, the position is similar to that of trends in area (Tab 3.5 & Fig 3.5 (b)). Here again, there is a down ward trend and almost all the districts follow suit, except the districts of Moradabad, Budaun and Rampur which indicate an upward trend with the growth of 6.61 percent, 2.60 percent and 1.84 percent per annum respectively. The seven out of twenty one districts indicate downward trend with a value of more than -6 percent per annum. They are Etah, Meerut, Etawah, Farrukhabad, Firozabad, Mathura and Aligarh. Besides these districts, the trend values in other regions are in diminishing order ranging from more than -5 percent to less than -1 percent per annum.

The area and production under total food grain have declined during trienniums 1992-95 & 2002-05. There is upward trend only in five districts namely, Agra, Bareilly, Rampur, Firozabad and Pilibhit with respect to area under food-grains (Tab 3.6 & Fig 3.6 (a)). The remaining nineteen districts show a downward trend varying from -0.10 percent in Gautam Budha Nagar to -5.56 percent per annum in Farrukhabad.

Table 3.4: District Wise, Area and Production of Total Cereal during Trienniums 1992-95 & 2002 -2005

Districts	Area (in Hectare)		Change	Annual growth (in %)	Production (In tonnes)		Change	Annual growth (in %)
	1992-95	2002-05			1992-95	2002-05		
Saharanpur	221748.33	173240.7	-48507.63	-2.187	536947	445815	-91132	-1697
Muzaffarnagar	190759.66	151471.3	-39288.36	-2.059	550449.3	486179.3	-64270	-1.167
Meerut	186294.66	92971.67	-93322.99	-5.009	581505.3	317227	-264278.3	-4.54
Bagpat	87641.33	59840.33	-27801	-3.172	320135	210496	-109639	-3.424
Bulandshahar	390111	299511.3	-90599.7	-2.322	1072369	893394.3	786155.3	7.331
Ghaziabad	147706.66	112343	-35363.66	-2.394	423274.7	360042.3	-63232.4	-1.493
Gautam Budha Nagar	110321.66	95207.33	-15114.33	-1.370	591826.7	271738.3	-320088.4	-5.408
Aligarh	430308	370499.7	-59808.3	-1.389	974126.3	983566.3	9440	0.096
Hathras	197751.33	142779.7	-54471.63	-2.761	297502	388707	91205	3.065
Mathura	275652.66	265675.7	-9976.96	-0.361	690003.3	767249.3	77246	1.119
Agra	190425	236595.7	.46170.7	2.424	420515.7	609464.7	188949	4.493
Firozabad	184458.33	194792.7	10334.37	2.560	405485	461201.3	55716	1.374
Mainpuri	227907.66	222189	-5716.66	-0.250	528186.3	535632.7	7446.4	0.140
Etah	367612.66	360641	-6971.66	-1.031	752421.3	832519.7	80098.4	1.064
Bareilly	342473.33	354727.3	12253.97	-1.357	680581.3	813798.7	133217.4	1.957
Budaun	498959	485544.7	-13414.3	-0.268	932717	1087888	155171	1.663
Shajhanpur	420741	422668.7	1927.7	0.045	1016399	1166589	150190	1.477
Pilibhit	292592.33	298007.3	5414.97	0.185	732721.7	852101.3	119379.6	1.629
Bijnor	186839	160929.3	-25909.7	-1.386	470264	437017.3	-33246.7	-0.706
Moradabad	493302.33	350977.3	-142325.03	-2.885	1146357	880300	-266057	-2.320
Jyotibafule Nagar	210315	126510	-83805	-3.984	415283	326287	-88996	-2.143
Rampur	251019.66	253630.7	2611.04	0.104	667315	679377.7	12062.7	0.180
Farrukhabad	281896.33	129638	-152258.33	-5.401	615091.7	328267.7	-286824	-4.663
Etawah	325982	173970	-152012	-4.663	733899.3	432647	-301252.3	-4.104

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

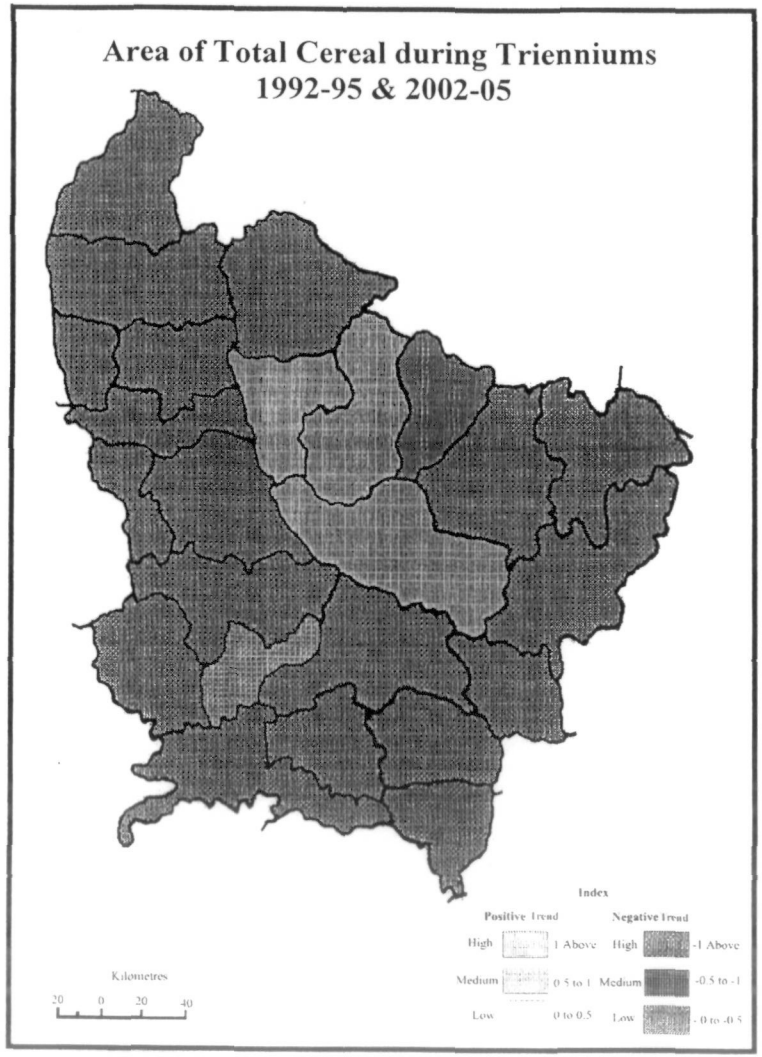

Fig.3.4 (a)

Fig.3.4 (b)

In respect of production, the position is more or less same. Once again, a large number of districts (fifteen) indicate a down ward trend varying from -0.03 percent in Mainpuri to -4.75 percent per annum in Farrukhabad (Tab 3.6 & Fig. 3.6 (b)). The least negative trends of less than -1 percent are seen in the districts of Gautam Budha Nagar, Aligarh, Hathras, Mainpuri and Bijnor. The districts followed an upward trend under total food grains are Agra, Firozabad, Bareilly, Budaun, Shahjahnapur, Pilibhit and Mathura. The highest growth rate has been recorded from the district Agra (4.03 percent per annum). The least upward trend has been registered from the district Rampur.

The trends in area under total oil seeds are comparatively positive in thirteen districts out of twenty four districts and the remaining eleven districts indicate a downward trend (Table 3.7 & Fig 3.7 (a)). High trends of growth in area are recorded in the districts of Bijnor, Moradabad and Aligarh with a rate of 34.92 percent, 24.97 percent and 11.20 percent per annum respectively. A group of four districts namely Mainpuri, Baghpat, Ghaziabad and Jyotibafule Nagar indicate the values of growth ranging between 2 percent and 7 percent per annum. Another set of five districts show the variation of trend in area under oil seeds ranging from more than zero to below than 1 percent. Such districts are Etah, Muzaffarnagar, Meerut, Hathras and Saharanpur.

The downward trend is much pronounced in the districts of Farukhabad (-8.35 percent), Agra (-8.02 percent), Mathura (-7.91 percent), Budaun (-7.29 percent), Shahjahanpur (-7.04 percent), Bulandshahar (-6.887 percent), Bareilly (-6.04 percent), and Etawah (-5.14 percent per annum).

The remaining districts indicate the values of negative trend ranging from -1.95 percent in Pilibhit to 4.05 percent per annum in Firozabad. As regards the trend of production of oilseeds the all twenty four districts, surprisingly, show negative shift (Tab 3.7 and fig. 3.7 (b)). This negative trend varies from -0.76 percent in Agra to -9.43 percent per annum in Saharanpur

Table 3.5 District Wise, Area and Production of Total Pulses during Trienniums 1992-95 & 2002 -2005

Districts	Area (in Hectare)		Change	Annual growth (in %)	Production (In tonnes)		Change	Annual growth (in %)
	1992-95	2002-05			1992-95	2002-05		
Saharanpur	11461	7479.33	-3981.67	-3.474	7289.33	4146.33	-3143	-4.311
Muzaffarnagar	11332.67	5957.33	-5375.34	-4.743	7927.66	3391.33	-4536.33	-5.722
Meerut	9571	3244	-6327	-6.610	8815.33	2596.33	-6219	-7.054
Bagpat	1978.66	1687.33	-291.33	-1.472		1293.33	-639.33	-3.308
Bulandshahar	30179.67	19402.67	-10777	3.570	29151	16680.33	-12470.67	-4.277
Ghaziabad	7245.667	3674	-3571.66	-4.929	8040.33	3234	-4806.33	-5.977
Gautam Budha Nagar	3982	3587	-395	-1.004		3168	-724	-1.860
Aligarh	60789	26922	-33867	-5.571	55896	20080.33	-3581.67	-6.407
Hathras	9894.66	9006.33	-888.33	-0.897		7785.66	-196.67	-0.246
Mathura	13659.33	4857.33	-8802	-6.443	10973	3682	-7291	-6.644
Agra	17591	11761.33	-5829.67	-3.314	23341.66	13466.66	-9875	-4.230
Firozabad	15844.33	6613.33	-9231	-5.826	18638	6818	-11820	-6.341
Mainpuri	17763	8852	-8911	-5.016	18895.33	9478.33	-9417	-4.983
Etah	54102.33	16381.67	-37720.66	-6.972	60313.66	12096.66	-48217	-7.994
Bareilly	26181	20190	-5991	-2.288	19031	13945.33	-5085.67	-2.672
Budaun	31332.33	41884	10511.67	3.367	25107.66	31636.66	6529	2.600
Shajhanpur	38322.33	18792.67	-19529.66	-5.096	23300	12274.33	-11125.67	-0.474
Pilibhit	10916.67	6009	-4907.67	-4.495	5617.33	4443	-1174.33	-2.090
Bijnor	10510.33	4697.33	-5813	-5.530	7466.66	4407.33	-3059.33	-4.097
Moradabad	11472	17901.67	429.67	5.604	8517.33	14154.33	5637	6.618
Jyotibafule Nagar	38913	4446	533	1.362		3267.66	-719.67	-1.804
Rampur	7177	7150.66	-26.34	0.036	6499.33	7700	1200.67	1.847
Farrukhabad	28475.67	7938.66	-20537.01	-7.212	26397.33	8088	-18309.33	-6.936
Etawah	51665	16169.33	-35495.67	-6.870	65035	20173.66	-44861.34	-6.898

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

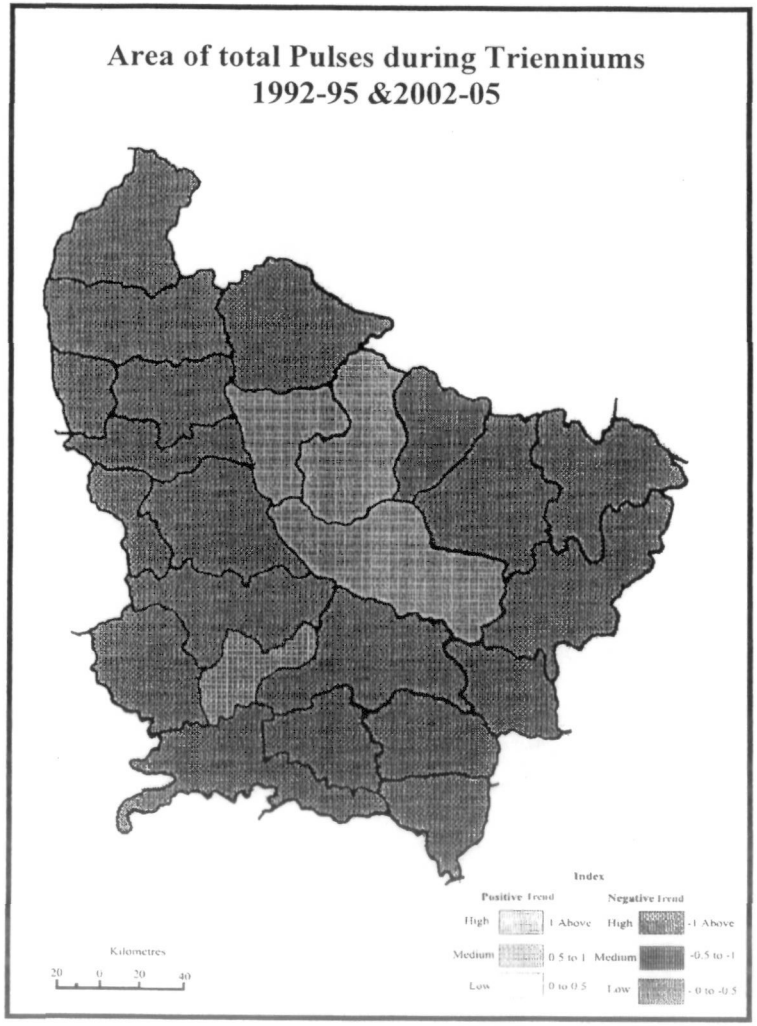

Fig.3.5 (a)

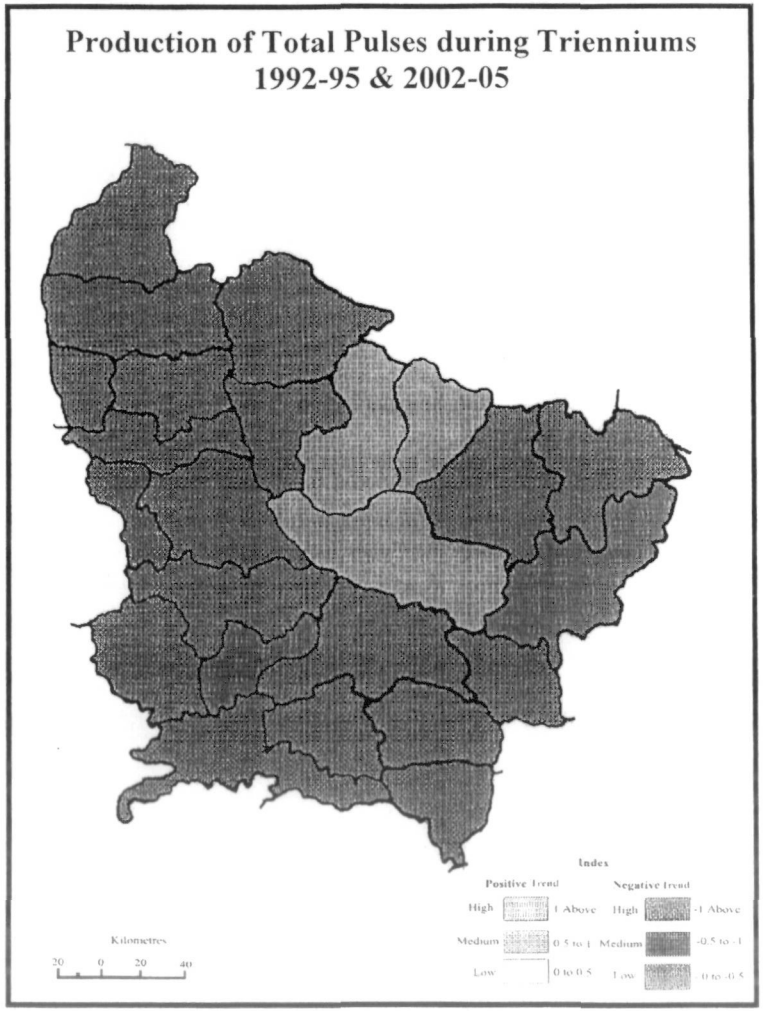

Fig.3.5 (b)

district. Out of twenty four districts, eight districts lie under the range of -6 percent to -9 percent per annum. Such districts are Saharanpur, Muzaffarnagar, Meerut, Etah, Budaun, Shajahanpur, Bijnor, Moradabad, Rampur, Farrukhabad, and Etah.

Out of total twenty four districts, an equal number of twelve districts indicate an upward trend and the remaining half districts show a downward trend in area under rice cultivation. The tendency of increase in area varies from 0.03 percent in Shahjahanpur to 24. 92 percent per annum in Bulandshahar districts (Tab 3.8 & fig. 3.8 (a)). Among the districts having positive trend, the highest increase in area has been recorded from Aligarh, Firozabad, Agra, Ghaziabad and Mathura with a growth rate of 13.00 percent 9.85 percent, 9.56 percent, 6.50 percent and 5.82 percent per annum respectively. In another set of districts, the growth rate varies from less than 1 percent to more than 2 percent per annum. The declining trend in area is more pronounced in the districts of Farrukhabad (-5.63 percent), Etawah (-4.71 percent), Muzaffarnagar (-3.84 percent), Jyotibaful Nagar (-2.99 percent), Baghpat (-2.489 percent) Saharanpur (-2.179 percent), Bijnor (-2.14), Meerut (-2.01 percent) and Moradabad (-1.08 percent per annum), in the remaining districts where down-wards trends is less than -1 percent per annum.

As regards production, there appears a close correlation between the trends of growth in area and production under rice (Tab 3.8 & fig 3.8(b)). The highest growth with 34.03 percent per annum has been recorded from the district Bulandshahr. Aligarh with 13.98 percent, Agra 9.45 percent, Ghaziabad 7.64 percent and Mathura and Hathras with 5.25 percent and 5.20 percent per annum respectively, lie under second phase of positive trend of growth. The remaining districts indicate a growth trend ranging between less than 1 percentto more than 2 percent per annum. The thirteen districts indicate a downward trend, the values ranging from -0.21 percent in Shahjhanpur to -5.40

Table 3.6: District Wise, Area and Production of Total Food Grains during Trienniums 1992-95 & 2002 -2005

Districts	Area (in Hectare)		Change	Annual growth (in %)	Production (In tonnes)		Change	Annual growth (in %)
	1992-95	2002-05			1992-95	2002-05		
Saharanpur	233209.3	180720	-52489.3	-2.250	544233	449961.3	-94271.7	-1.732
Muzaffarnagar	202092.3	157428.7	-44663.6	-2.210	558377	489570.7	-68806.3	-1.232
Meerut	195865.7	96215.67	-99650.03	-5.087	590320.7	319823.3	-270497.4	-4.582
Bagpat	68436.3	61527.67	-6908.63	-1.009	2853417.7	211789.3	-73552.4	-2.577
Bulandshahar	420290.7	318914	-101376.7	-2.412	1101520	910074.7	-191445.3	-1.738
Ghaziabad	154952.3	116017	-38935.3	-2.512	431315	363276.3	-68038.7	-1.577
Gautam Budha Nagar	99872.3	98794.33	-1077.97	-0.107	301321	274906.3	-26414.7	-0.876
Aligarh	491097	397421.7	-93675.3	-1.907	1030022	1003647	-26375	-0.856
Hathras	19782	151786	-46039	-2.327	409123.7	396492.7	-1261	-0.308
Mathura	289312	270533	-18779	-0.649	700976.3	770931.3	69955	0.997
Agra	208016	248357	40341	1.939	443857.3	622931.3	179074	4.034
Firozabad	200302.7	201406	1103.3	0.055	424123	468019.3	43896.3	1.034
Mainpuri	245670.7	231041	-14629.7	-0.595	547081.7	545111	-1970.7	-0.036
Etah	421715	377022.7	-44692.3	-1.059	812735	844616.3	31881.3	0.392
Bareilly	368654.3	374917.3	6263	0.169	699612.3	827744	128131.7	1.831
Budaun	530291.3	527428.7	-2862.6	-0.053	957824.7	1119524	161699.3	1.688
Shajhanpur	459063.3	441461.3	-17602	-0.383	1039699	1178864	139165	1.338
Pilibhit	303509	304016.3	507.3	0.016	738339	856544.3	118205.3	1.600
Bijnor	197349.3	165626.7	-31722.6	-1.607	477730.7	441424.7	-36306	-0.759
Moradabad	504774.3	368879	-135895.3	-2.692	1154874	894454.3	-260419.7	-2.254
Jyotibafule Nagar	187231	130956	-56275	-3.005	397628.3	329554.7	-68073.6	-1.711
Rampur	258196.7	260781.3	2584.6	0.100	673814.3	687077.7	13263.4	0.196
Farrukhabad	310372	137576.7	-1727953	-5.567	641489	336355.7	-305133.3	-4.756
Etawah	377647	190139.3	-187507.7	-5.965	798934.3	452820.7	-346113.6	-4.332

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

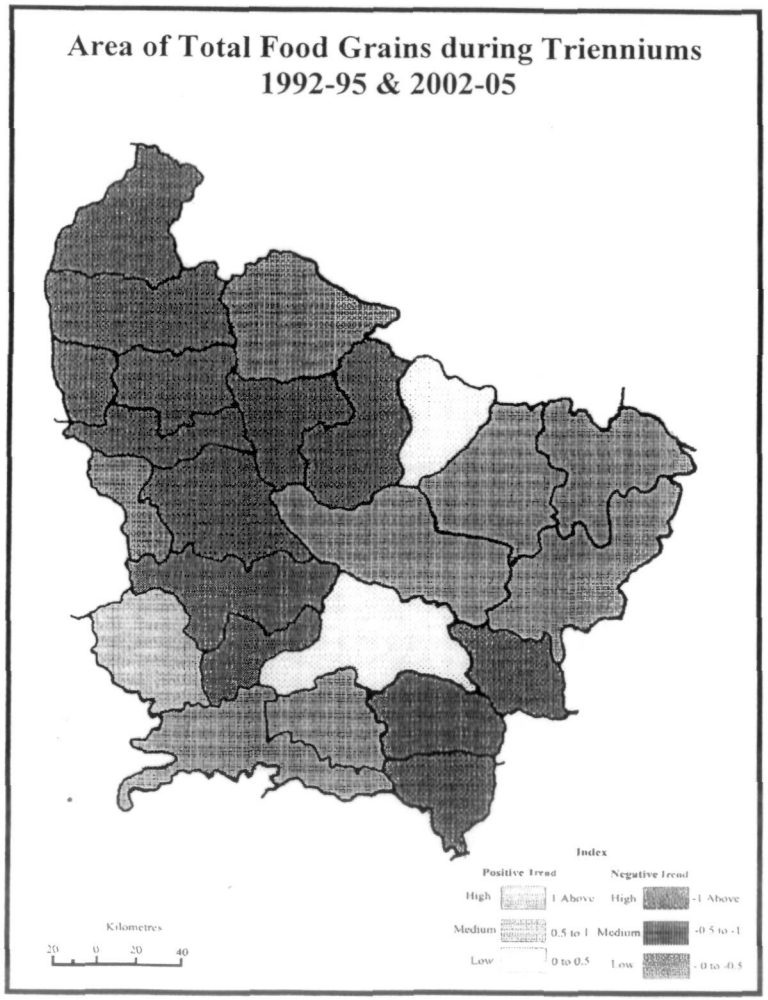

Fig.3.6 (a)

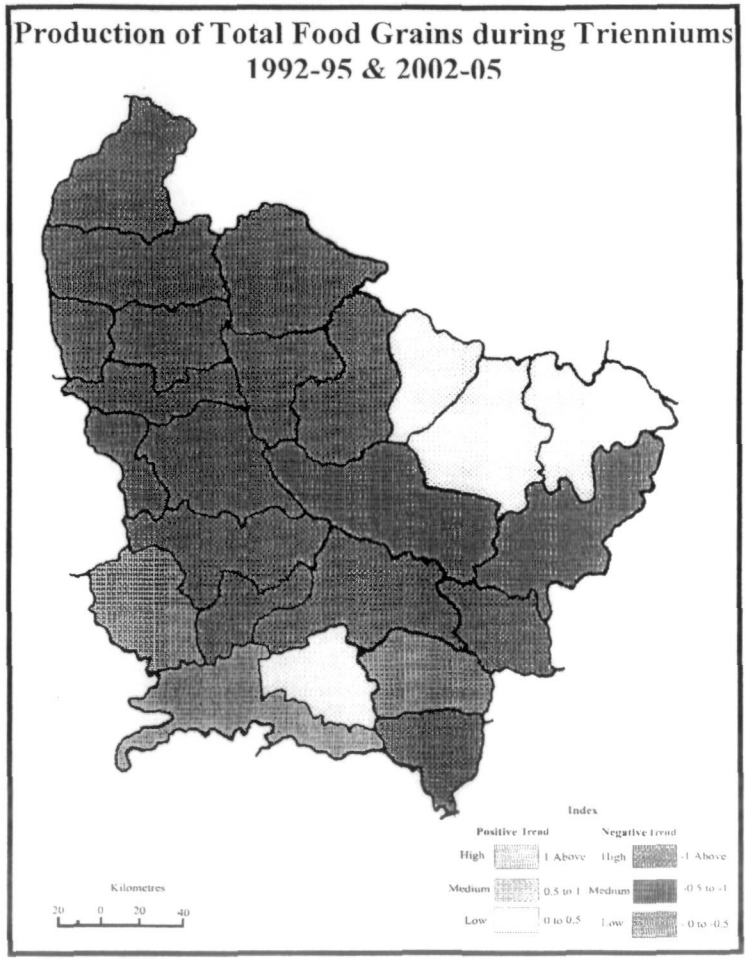

Fig.3.6 (b)

percent per annum in the district Farrukhabad. The main problem facing rice cultivation is the amount and incidence of rainfall. Maize has shown a significant upward as well as downward trend in area. A sufficient number of districts indicate a negative trend. With regards to trends in area under maize, thirteen districts show an upward trend (Table 3.9 & fig 3.9 (a)). The variations between two extremes are 1.28 percent in Bareilly and 18.01 percent per annum in Firozabad district. Eight districts recorded a growth rate more than 5 percent and the values of five districts ranges among 1 percent to 5 percent per annum. In case of down ward trend, variation ranges between -0.90 percent in Jyotibafule Nagar and -8.38 percent per annum in Bijnor district. However, out of eleven districts, the values of ten districts ranges between -2 percent to -9 percent per annum.

With regards production, out of twenty four districts, the twenty three districts show a downward trend. Firozabad, exceptionally, showing a 1.02 percent rate of growth per annum. The variation in downwards trend ranges between -0.070 percent in Mathura and -9.45 percent per annum in Bijnor district (Tab 3.9 & fig 3.9 (b)). However, ten districts have a trend value more than -5 percent and the trend value of remaining thirteen districts falling below-5 percent per annum.

The position of onion deteriorated largely. All districts of the region show a downward trend in respect of area and production. The downward trend of onion pronounced under area varies between -0.74 percent per annum in Aligarh district and -9.08 percent per annum in Agra (Tab 3.10 & fig. 3.10(a)). The value of twenty one districts, out of twenty four districts lie between -5 percent to -9 percent per annum while the trend of value of remaining three districts coincide within -5 percent per annum.

As regards the trends in production of onion, the situation is rather deteriorated further (Table 3.10 & fig 3.10 (b)). All districts alarmingly pronounced a downward trend. The trend of values in twenty three districts out

Table 3.7: District Wise, Area and Production of Total Oilseeds during Trienniums 1992-95 & 2002 -2005.

District s	Area (in Hectare)		Change	Annual growth (in %)	Production (In Tonnes)		Change	Annual growth (in %)
	1992-95	2002-05			1992-95	2002-05		
Saharanpur	8698.333	8924.667	266.33	0.260	8367.33	475.6667	-7891.67	-9.431
Muzaffar Nagar	4285.333	4605.667	320.33	0.747	4657.66	782.6667	-3875	-8.319
Meerut	6108.333	6538.667	430.333	0.704	6652.33	1401.333	-5251	-7.893
Bagpat	12420.33	17829.33	5409	4.354	836	746	-90	-1.076
Bulandshahar	17138	5334.333	-11803.67	-6.887	18192.67	3051.333	-15141.34	-8.322
Ghaziabad	4935	64306.33	14956.33	3.030	5390.33	1057	-4333.33	-8.039
Gautam Budha Nagar	79121.33	83132.67	4011.34	0.506	810	716	-94	-1.160
Aligarh	63637	134954.3	71317.3	11.206	58890	12738	-46152	-7.837
Hathras	29352	30357.67	1005.67	0.342	5792	4985	-807	1.393
Mathura	79590.67	16591	-62999.67	-7.915	76198.33	16328.33	-59870	-7.857
Agra	122665	24265.67	-98399.33	-8.021	144731	34199	-110532	-0.762
Firozabad	29348.33	17459	-11889.33	-4.051	30496.33	6585	-23911.33	-7.840
Mainpuri	16172	27437.67	11265.67	6.966	15128.33	3600	-11528.33	-7.620
Etah	24485.33	29212.33	4727	1.930	21702.67	5915.667	-15786.95	-7.274
Bareilly	19641.67	7768	-11873.67	-6.045	11570.33	4097	-7473.33	-6.459
Budaun	29032	7863.333	-21168.67	-7.291	22205.67	6417	-15788.67	-7.110
Shajhanpur	34061	10058	-24003	-7.047	19055.67	1452.667	-17603.01	-9.237
Pilibhit	9430	7590.333	-1839.67	-1.950	4608.33	2074	-2534.33	-5.499
Bijnor	8821	39627	30806	34.923	7099.33	923.6667	-6175.67	-8.706
Moradabad	10917.67	38181.33	27263.66	24.972	9645	2505	-7140	-7.402
Jyotibafule Nagar	7232.33	8924.667	1692.33	2.339	1905	1606.667	-298.34	-1.566
Rampur	7264.333	4605.667	-2658.67	-3.659	6783.66	1942.333	-4841.33	-7.136
Farrukhabad	39793.67	6538.667	-33255.01	-8.350	39001.33	4586.333	-3445	-8.824
Etawah	36711.33	17829.33	-1882	-5.143	39293.33	5659.333	-33634	-8.559

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

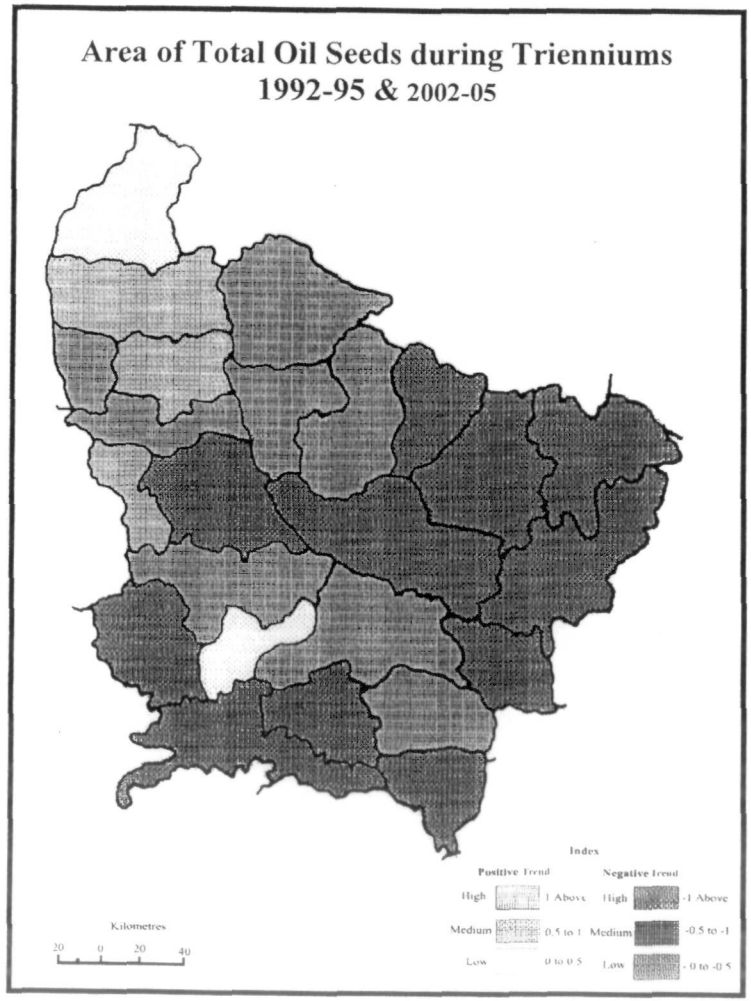

Fig.3.7 (a)

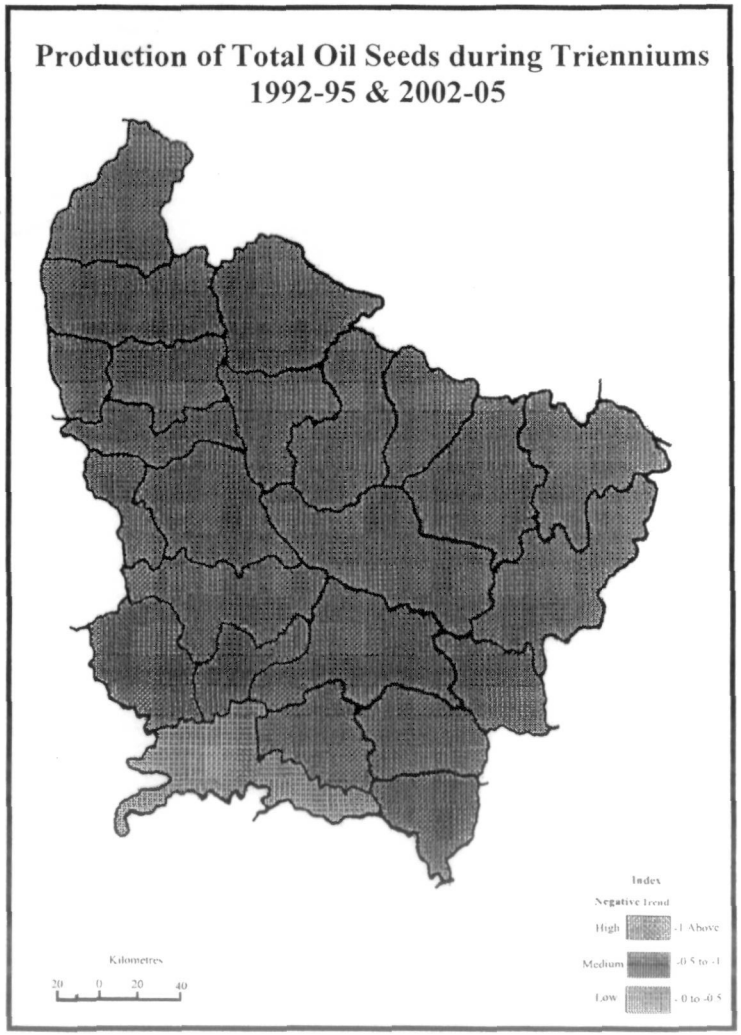

Fig.3.7 (b)

of twenty four varies from -8 percent to -9 percent per annum. Baghpat is the only district which has a negative trend of -5.55 percent per annum.

The trend in area under Sugarcane follows an upward as well as downward direction. The upward and downward trends have equal numbers in division i.e. twelve division each of twenty four districts. The upward values having a minimum range of 0.65 percent in Farrukhabad district to a maximum 3.61 percent per annum in Budaun district (Tab 3.11 & fig 3.11(a)). The downward trend is more pronounced in the districts namely, Etawah, Moradabad, Firozabad, Agra, Mainpuri, Mathura, Hathras and Meerut indicating more than 2 percent per annum.

In case of trends showing in production under sugarcane, the position is similar to that of trends in area (Tab 3.11 & fig 3.11 (b)). Here again, the eleven districts fall under upward trend of growth while the remaining thirteen districts lie under downward trend. The highest trend with a growth rate of 9.99 percent and 8.77 percent per annum has been reported from the districts Bareilly and Gautm Budha Nagar respectively. The growth rate of remaining nine districts lies in the range of 5 percent per annum.

Growth rates has accelerated in all parts of India after independence. This growth rate came as a result of developments in rural agricultural infrastructure over time, such as irrigation, agricultural research and development and extension services.

Table 3.12 and fig. 3.12 reflects the trend of growth of yield of wheat (Kg/ha) in 24 districts of western Uttar Pradesh. It has been seen that the yield of wheat (Kg/ha) has been increasing over time. The highest annual percentage growth has been recorded from the district Meerut, as it grew upto 5.66 percent during the triennium 2002-05. With the introduction of HYVs, irrigation via tube wells which provide assured and timely irrigation which led to rapid growth in that triennium.

Table 3.8: District Wise, Area and Production of Total Rice during Trienniums 1992-95 & 2002 -2005

Districts	Area (in Hectare)		Change	Annual growth (in %)	Production (In tonnes)		Change	Annual growth (in %)
	1992-95	2002-05			1992-95	2002-05		
Saharanpur	74078	47930	-26148	-2.179	171876.3	105116.7	-66759.6	-3884
Muzaffarnagar	40528.67	24939.67	-15589	-3.846	99857	61926.33	-37930.67	-3.798
Meerut	16722	13346.67	-3375.33	-2.018	39341	31540	-7801	-1.982
Bagpat	3896	2926	-970	-2.489	7983	7388.333	-594.6	-0.744
Bulandshahar	11175.33	39024.67	27849.34	24.920	20419.33	91957	71537.67	35.034
Ghaziabad	11498.67	18983	7484.33	6.508	25571	45132	19561	7649
Gautam Budha Nagar	10123.33	11642.33	1519	1.500	29123.76	25065.33	4941.57	2.455
Aligarh	12688	29194.67	16506.67	13.009	24833.67	59568.67	34735	13.987
Hathras	6325	7981	1656	2.618	10321.7	15695.67	5373.97	5..206
Mathura	17869.67	28277.67	10408	5.824	40622	61972.67	21350.67	5.255
Agra	378.6667	741	362.34	9.569	754.6667	1468	713.34	9.452
Firozabad	13427	13236.33	-190.67	9.857	23519.33	29390.67	5871.34	2.496
Mainpuri	47515.33	54239.33	6724	1.415	95135.67	103181.3	8045.63	0.845
Etah	32785	31464.33	-1320.67	-0.402	62940.67	57461	-5479.67	-0.870
Bareilly	141112.3	153735.7	12623.4	0.894	260066.7	301971.3	41904.6	1.611
Budaun	68429.33	56473	-11956.33	-1.747	113305.3	96144.67	-17160.63	-1.514
Shajhanpur	161632.7	162232	599.3	0.037	366559.7	358649.7	-7110	-0.215
Pilibhit	145693.7	144051.7	-1642	-0.112	362206.3	383928.7	21722.4	0.599
Bijnor	63263.33	49678	-13585.33	-2.147	168712	134118.3	-34593.7	-2.050
Moradabad	125738.3	112059.7	-136786	-1.087	296320.3	261504.7	-34593.7	-1.167
Jyotibafule Nagar	32150.67	22520.67	-9630	-2.995	59102	51036	-8064	-1.364
Rampur	115937	116494.7	557.7	0.048	265991	254809	-11182	-0.420
Farrukhabad	26801.67	11687	-15114.67	-5.639	51508.33	23651.67	-27856.66	-5.408
Etawah	77636	41048.67	-36587.33	-4.712	166548	101380	-65168	-3.912

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

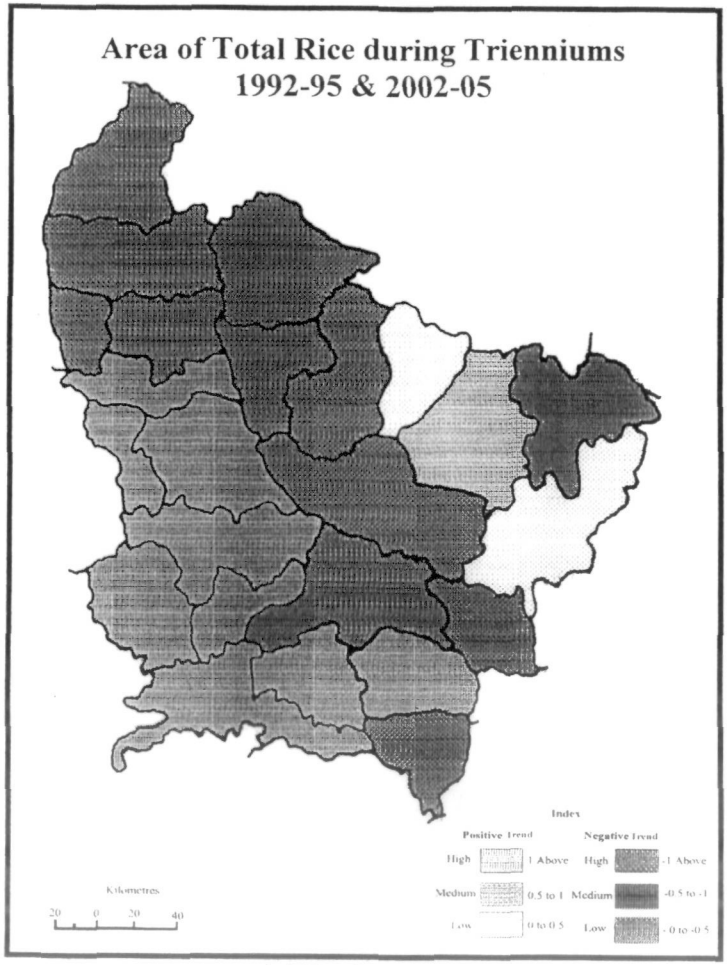

Fig.3.8 (a)

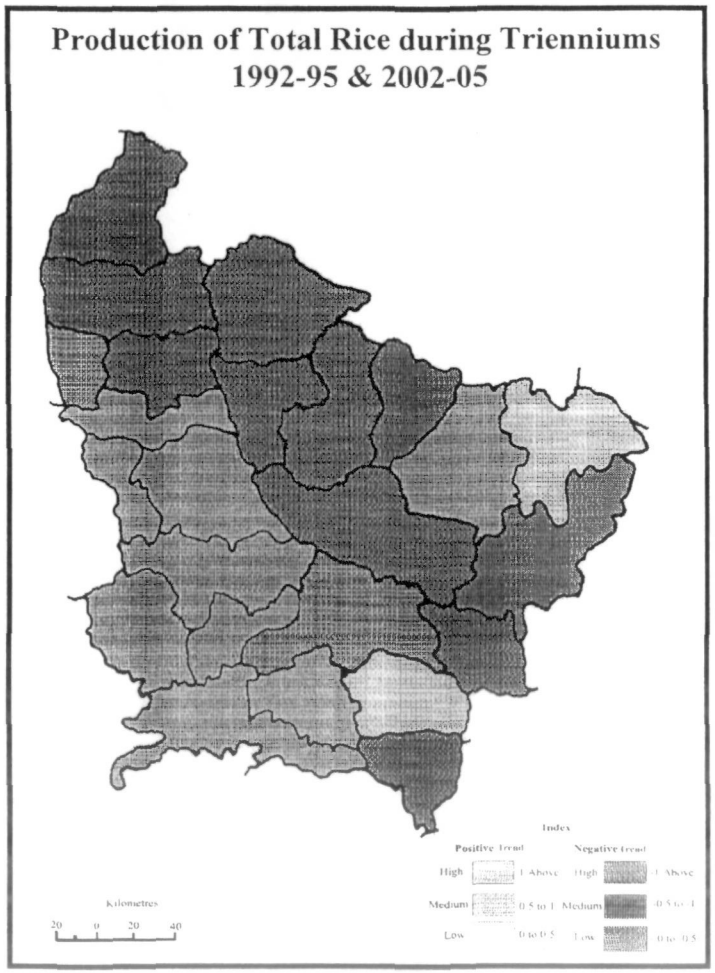

Fig.3.8 (b)

The other districts follow Meerut in percentage of annual growth are Shahjahanpur, Pilibhit, Hathras, Bareilly, and Buduan. It has been observed that these districts have an annual growth rate in the order of almost 1.00 percent per annum. Increase in irrigated area and improved cultural practices have resulted in dramatic increase in yield of wheat.

The main source of growth in yield is technological break-through in wheat. The adoption and spread of HYV of wheat involved use of fertilizers and irrigation which produced quick results as there was quantum jump in yield. Consequently, the over all growth of yield has shown upward trendily movement by the triennium 2002-05.

Through all the succeeding years from 2001-02 on wards, wheat yields were still substantially higher in the western districts of Uttar Pradesh. It is true that irrigation is slightly higher in the western Uttar Pradesh; it is likely that other factors are also playing a role in higher yield and out put levels of wheat. Ghaziabad, Rampur and Gatuam Budha Nagar are exception among all the 24 districts of western Uttar Pradesh which are showing low growth rate in percent per annum. The changing land used pattern may be a probable reason of low productivity. The average operational land holding is fragmented too. This makes mechanized from operations difficult.

The production of barley is mainly concentrated in those of wheat producing regions of western Uttar Pradesh. There is wide difference in yield kg/ha of barley, recorded a highest 5.95 percent annual growth during trienniums 1992-95 & 2002-2005 to a lowest –2.66 percent negative trend over the same trienniums (Table 3.13 & Fig. 3.13).

The high rate of growth has been recorded from the districts Farrukhabad, Pilibhit, Shahjahanpur, Budaun and Bareilly, these all districts have been recorded an over 5.00 percent growth rate per annum.

Table 3.9: District wise, Area and Production of Total Maize during Trienniums 1992-95 & 2002 -2005

Districts	Area (in Hectare)		Change	Annual growth (in %)	Production (In tonnes)		Change	Annual growth (in %)
	1992-95	2002-05			1992-95	2002-05		
Saharanpur	12593.33	22040	9446.67	7.501	17934.67	9191.667	-8743.01	-4.873
Muzaffarnagar	4724.33	1847	-2877.33	-6.090	7372.333	759.3333	-6613	-8.970
Meerut	16495.33	7515	-8980.33	-5.444	26211.67	3118.667	-20393	-8.810
Bagpat	1923	1034	-889	-4.622	512	424	-88	-1.718
Bulandshahar	127279.3	188039	60759.7	4.773	224930.3	103251.7	-121678.6	-5.409
Ghaziabad	25806.67	12037	-13769.67	-5.335	43831.67	5625.667	-38206.01	-8.717
Gautam Budha Nagar	20132	14740	-5392	-2.678	7042.3	6893.333	-148.97	-0.211
Aligarh	52747.67	88482	35734.33	6.774	82996.33	45298	-37698.33	-4.542
Hathras	10231	11673	1442	1.409	5712.67	4874.667	-838.01	-1.466
Mathura	1539.667	798	-741.66	-4.819	1407.333	417	-990.33	-0.070
Agra	194	440	246	12.680	276	233.3333	-42.67	-1.546
Firozabad	8943	25053	16110	18.014	13419	14791	1372	1.022
Mainpuri	34512	96026	61514	17.823	66695.33	57246.67	-9448.66	-1.416
Etah	58182	138225	80043	13.757	99350.33	65067.67	-34282.66	-3.450
Bareilly	1413	1594	181	1.280	1649	798	-851	-5.160
Budaun	24370	40060	15690	6.438	30076	20357.67	-9718.33	-3.231
Shajhanpur	5222.333	7961	2738.67	5.244	6042.333	3400.667	-2641.67	-4.371
Pilibhit	1175.333	896	-279.33	-2.376	1463.333	455.3333	-1008	-6.888
Bijnor	463.6667	75	-388.66	-8.382	592.3333	32	-560.33	-9.459
Moradabad	13461.67	7676	-5785.67	-4.297	18382	3214.333	-15167.67	-8.251
Jyotibafule Nagar	8910	8106	-804	-0.902	3215.33	2834.333	-381	-1.184
Rampur	1537.333	827	-710.33	-4.620	1700	327.3333	-1372.67	-8.074
Farrukhabad	84328.67	113291	28962.33	3.434	133631.7	64961	-68670.7	-5.138
Etawah	23346.67	19363	-3983.67	1.706	36559.33	12389.67	-24169.66	-6.611

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

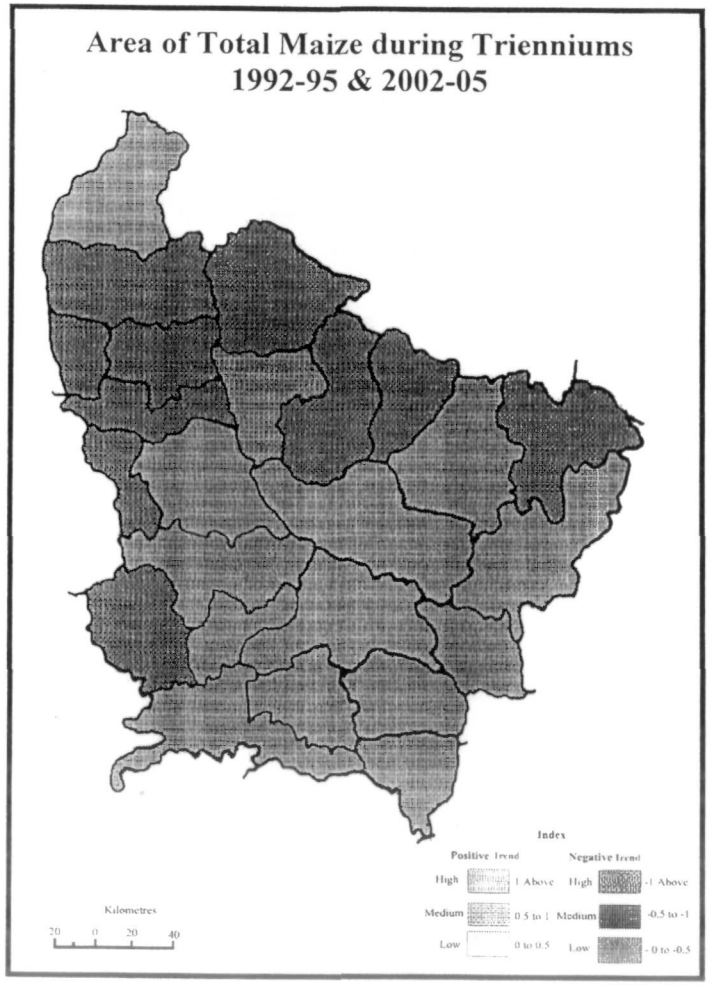

Fig.3.9 (a)

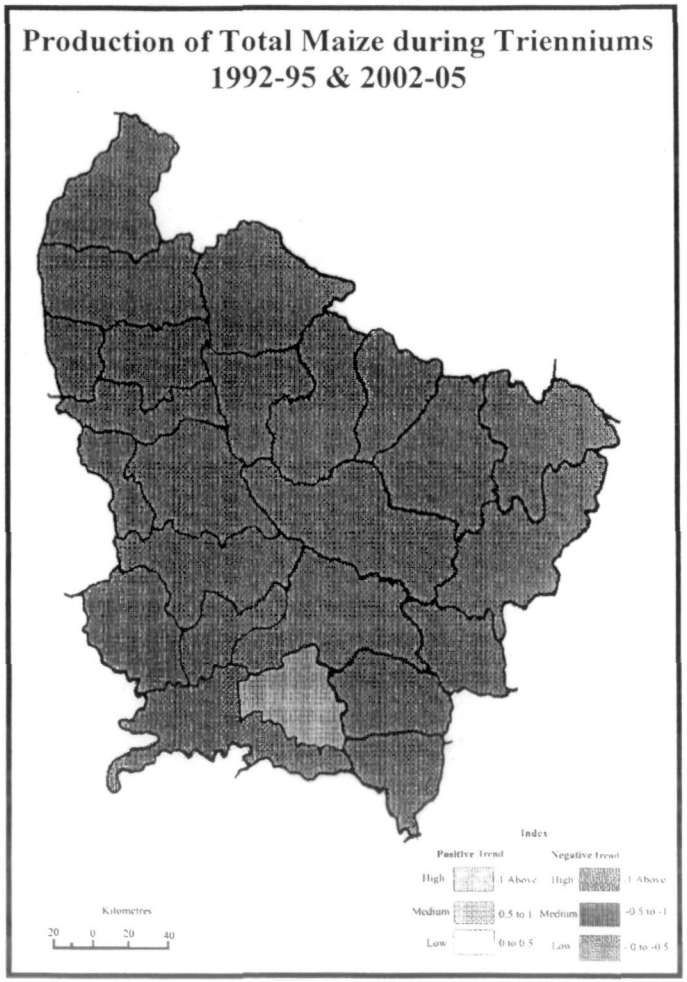

Fig.3.9 (b)

The negative rate of trend in yield kg/ha has been recorded from the districts of Saharanpur, Muzaffarnagar, Meerut, Baghpat, Ghaziabad and Gautam Budha Nagar.

Studies reveal that rainfall variation is an important reason for the variability of yield especially for barley in the area because agricultural output is fundamentally dependent on monsoon rain which exhibits high inter-annual intra seasonal and spatial variability. Growth in demand for staple foods, particularly barley is now slowing. By contrast, demand for other foods, including fruits, vegetables and livestock products are now showing relatively high, even accelerating growth.

Further, productivity of one hectare of gross irrigated area is reported to be 2.75 times the productivity of non-irrigated area (Dhawan, 1994). A simple exercise based on this information reveal that if irrigation potential is fully exploited it would raise present level of out put by 50 percent.

There is marked regional variability in yield kg/ha of potato in the districts of western Uttar Pradesh (Table 3.14 & Fig. 4.14). The highest yield kg/ha has been recorded from the districts of Bijnor, Etah and Hathras. Aligarh, Etawah, Rampur, Jyotibafule Nagar, Pilibhit and Farrukhabad have been recorded in the category of high growth rates of yield kg/ha. The districts with negative annual trend in percentage are Saharanpur, Muzaffarnagr, Bulandshahr, Ghaziabad and Gautam Budha Nagar.

It has been observed that adverse meteorological factors and possible climatic changes tend to further accentuate the problem. The worst affected are small and marginal farmers, tenants and share croppers, landless agricultural labourers since their cropping capacity is

Table 3.10: District Wise, Area and Production of Onion during Trienniums 1992-95 & 2002 -2005

Districts	Area (in Hectare)		Change	Annual growth (in %)	Production (In tonnes)		Change	Annual growth (in %)
	1992-95	2002-05			1992-95	2002-05		
Saharanpur	291.33	52.33	-239	-8.203	10873	560.3333	-10312.67-	-9484
Muzaffarnagar	499.33	145	-354.33	-7.046	18582	1686	-16896	-9.092
Meerut	370.33	53.66	-316.67	-8.551	13707	572.3333	-1313.4.67	-9.582
Bagpat	71	37	-34	-4.788	924	410.6667	-513.34	-5.555
Bulandshahar	824.33	147.33	-677	-8.212	30889	1596	-29293	-9.485
Ghaziabad	147.33	32	-115.33	-8.385	5429	357.3333	-5071.67	-9.341
Gautam Budha Nagar	53	20	-33	-6.226	3215	193.3333	-3021.67	-9.398
Aligarh	151.3333	66.33	-85	-0.741	5831	680	-5115	-8.833
Hathras	59	27.33	-31.67	-5.355	3014	293.6667	-2720.34	-9.025
Mathura	59	6.66	-52.34	-8871	2282	66	-2216	-9.710
Agra	163.33	15	-148.33	-9.081	6271	148.3333	-6122.67	-9.763
Firozabad	408.66	87.33	-321.33	-7.863	15697	948	-14749	-9.396
Mainpuri	601.66	269.33	-332.33	-5.523	22933	2726.667	-32020.6.34	-8.811
Etah	924.33	185.66	-738.67	-8.051	35595	1981.333	-33613.67	-9.443
Bareilly	1158.66	148.66	-1010	-8.716	46949	1590	-45359	-9.663
Budaun	3720.33	495.66	-3224.67	-8.667	129995	5342	-124653	-9.589
Shajhanpur	469.33	127.33	-342	-7.286	19386	1284	-18102	-9.337
Pilibhit	65	38.66	-26.34	-4.052	2766	442.6667	-2323.34	-8.399
Bijnor	223.66	15.66	-208	-9.299	8311	178.6667	-8132.34	-9.785
Moradabad	871.66	165	-706	-8.099	32680	1790.333	-30889.69	-9.455
Jyotibafule Nagar	53	13	-40	-7.547	2152	147.3333	-2004.67	-9.315
Rampur	225.66	99.66	-126	-5.583	8398	1143.667	-7254.34	-8.638
Farrukhabad	1856	341.33	-1514.67	-8.160	68891	3686.333	-65204.69	-9.464
Etawah	584.33	59.66	-524.67	-8.979	21668	641.6667	-21026.34	-9.703

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

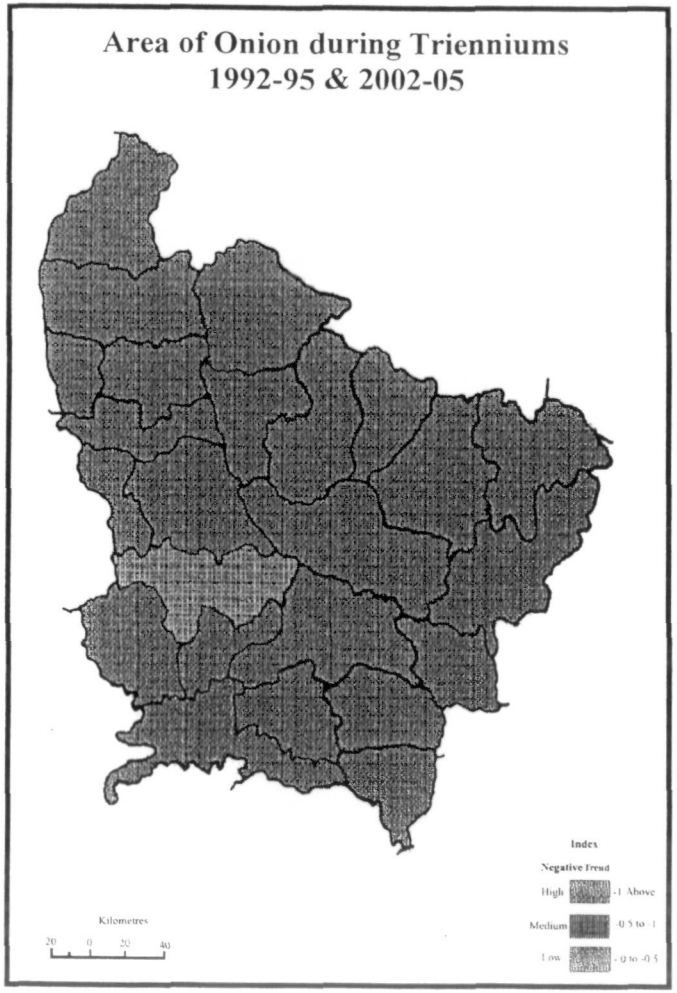

Fig.3.10 (a)

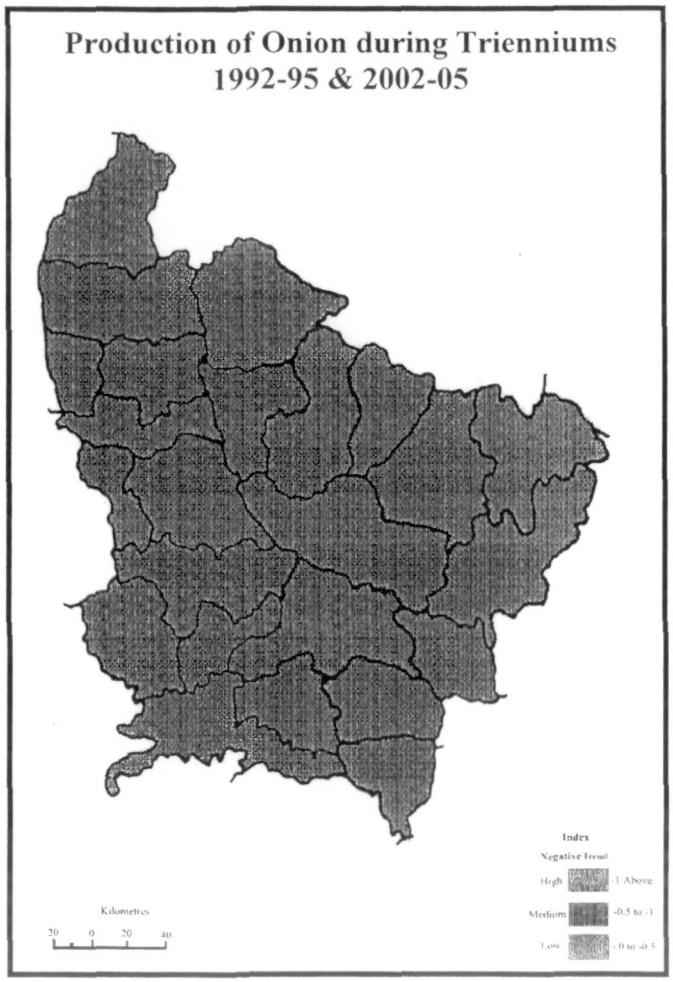

Fig.3.10 (b)

very limited. The consumption of chemical fertilizer is increased multifold and that of the irrigation from canals and tube wells also showed a reducing trend. The consolidation of land normally has benefited the big farmers and influentials. Certain physical constraints and wide spread failures and ignorance of natural resource management also contribute to the problem of low productivity.

The small farmers are also not getting minimum support prices of their produces. Hapur, a fertile agricultural belt in western Uttar Pradesh is known for its good potato crop. But now the productivity and production showed negative trend due to decline in price per unit weight of production even Rs. 100-150 a bag of 80 kg. They can not afford to keep the crop in cold storage, as it is expensive at Rs 70-75 a quintal. Besides, even storing it for a while does not help fetch enough returns.

A uniform growth of yield kg/ha has been reported in total cereal production in almost all districts of western Uttar Pradesh. It varies from over 1.00 percent to a marginal lower than 1.00 percent per annum (table 3.15 and fig. 3.15). The most significant change is the increase in the domestic out put of food grains, particularly cereals. The production of cereals increased marginally although significantly during the trienniums 1992-95 & 2002-2005. Increase in the production of cereals (one of the main staple food) has kept pace with the proper utilization of available land resources. The per capita out put of cereals had also increased. The long term growth rate of all cereals had shown significant changes.

Increase in domestic cereals production has happened for two reasons first, the irrigated area under cereals expanded considerably, reducing the dependency on uncertain rain falls. And second, the share of more stable grains (wheat) increased while unstable grains (Coarse cereals) decreased.

Table 3.11: District Wise, Area and Production of Sugar Cane during Trienniums 1992-95 & 2002 -2005

District s	Area (in Hectare)		Change	Annual growth (in %)	Production (In tonnes)		Change	Annual growth (in %)
	1992-95	2002-05			1992-95	2002-05		
Saharanpur	107213.3	136755.3	29542	2.775	7050000	8326367	1276367	1.810
Muzaffarnagar	195952	228422	32470	1.657	12935071	15444146	2509075	1.939
Meerut	168611	124663.7	-43947.3	-2.606	10447107	8107033	-2340074	-.239
Bagpat	71320.3	68422.67	-2897.63	-0.406	5321031	4423311	-897720	-1.687
Bulandshahar	44160	53706.33	9546.33	2.161	2640850	3190198	549348	2.080
Ghaziabad	52829.67	64758.33	11928.66	2.257	3390238	4132103	741865	2.188
Gautam Budha Nagar	2912.3	3392.333	480.03	1.648	113210	212573.3	99363.3	8.776
Aligarh	11620.67	9700.333	-1920.34	-1.652	699119	554265.3	-144853.7	-2.071
Hathras	631	423	-208	-3.296	31523	22145	-9378	-2.974
Mathura	10414.67	8309	-2105.67	-2.021	577944	421044	-156900	-2.714
Agra	705	183.3333	-521.67	-7.399	38712.33	9542.667	-29169.67	-7.534
Firozabad	217.3333	107.3333	-110	-5.061	13645.67	5613	-8032.67	-5.886
Mainpuri	645	395.6667	-249.34	-3.865	24806.33	20678.67	-4127.66	-1.663
Etah	8252.333	9150.333	898	1.088	455491.7	439346	-16145.7	-0.354
Bareilly	63611.67	76328.33	12716.66	1.999	3914059	4307229	392556	9.997
Budaun	17893	24361.67	6468.67	3.615	1038649	1431205	3913170	3.779
Shajhanpur	40750.67	47954	9203.33	1.767	2348000	2586060	238060	1.013
Pilibhit	40564.33	48969.67	8405.34	2.430	2509854	2732615	222761	0.887
Bijnor	180463.3	206275.7	25812.4	-4.897	11330420	12980017	1649597	1.445
Moradabad	129091.3	65864.67	-63226.63	-0.950	7582975	3654876	-3928099	-5.180
Jyotibafulenagar	83215.3	75304.67	-7910.63	-1.166	6532936	4581686	-1951250	-2.986
Rampur	25481.33	22509.33	-2972	0.678	1483288	1369312	-113976	-0.78
Farrukhabad	8038	8583	545	-7.542	451189	456034	4845	0.107
Etawah	3378	830	-2548		166337.3	41699.67	-124637.63	-7.493

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

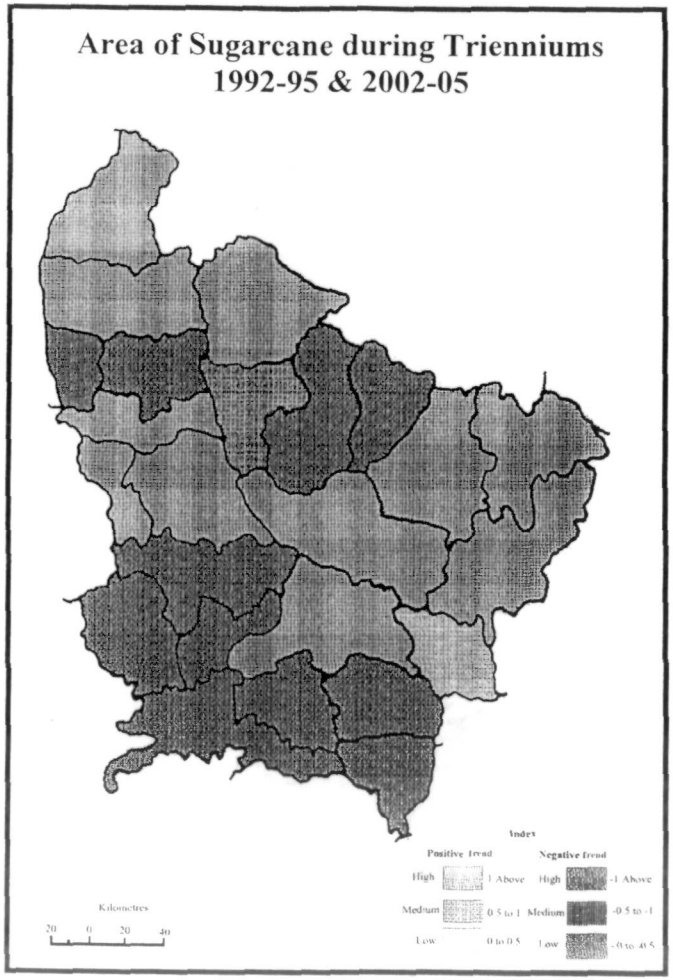

Fig.3.11 (a)

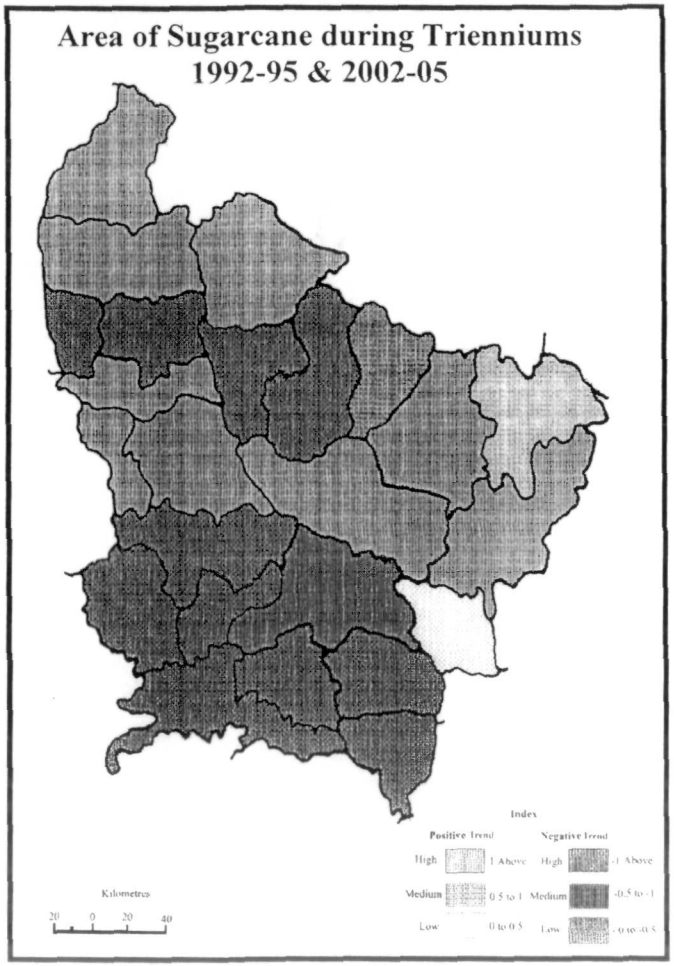

Fig.3.11 (b)

Table 3.12: Growth of Yield of Wheat at District Level during Trienniums 1992-95 & 2002-05

S.No.	Districts	Yield (Kg/ha)		Change	Annual growth (%)
		1992-95	2002-05		
1	Saharanpur	25.79	28.10	2.31	0.895
2	Muzaffarnagar	30.47	33.67	3.2	1.050
3	Meerut	23.44	36.72	13.28	5.665
4	Baghpat	33.27	36.16	2.89	.868
5	Bulandshahr	34.93	36.53	1.60	458
6	Ghaziabad	34.11	35.31	1.2	351
7	Gautam Budha Nagar	32.38	33.79	1.41	0.417
8	Aligarh	28.10	31.94	3.84	1.366
9	Hathras	26.82	31.97	5.15	1.920
10	Mathura	29.28	33.12	3.84	1.311
11	Agra	29.64	32.60	2.96	0.998
12	Firozabad	27.22	29.35	2.13	0.782
13	Mainpuri	26.94	29.38	2.44	0.905
14	Etah	24.84	28.07	3.23	1.300
15	Bareilly	22.45	26.19	3.7	1.648
16	Budaun	23.57	27.21	3.64	1.544
17	Shahjahanpur	26.42	31.78	5.36	2.028
18	Pilibhit	25.41	30.42	5.01	1.971
19	Bijnor	24.52	27.23	2.71	1.105
20	Moradabad	26.31	28.96	2.65	1.007
21	Jyotibafule Nagar	25.54	28.30	2.76	1.080
22	Rampur	31.28	31.85	0.57	0.182
23	Farrukhabad	27.67	31.32	3.65	1.319
24	Etawah	24.35	30.24	1.89	0.666

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

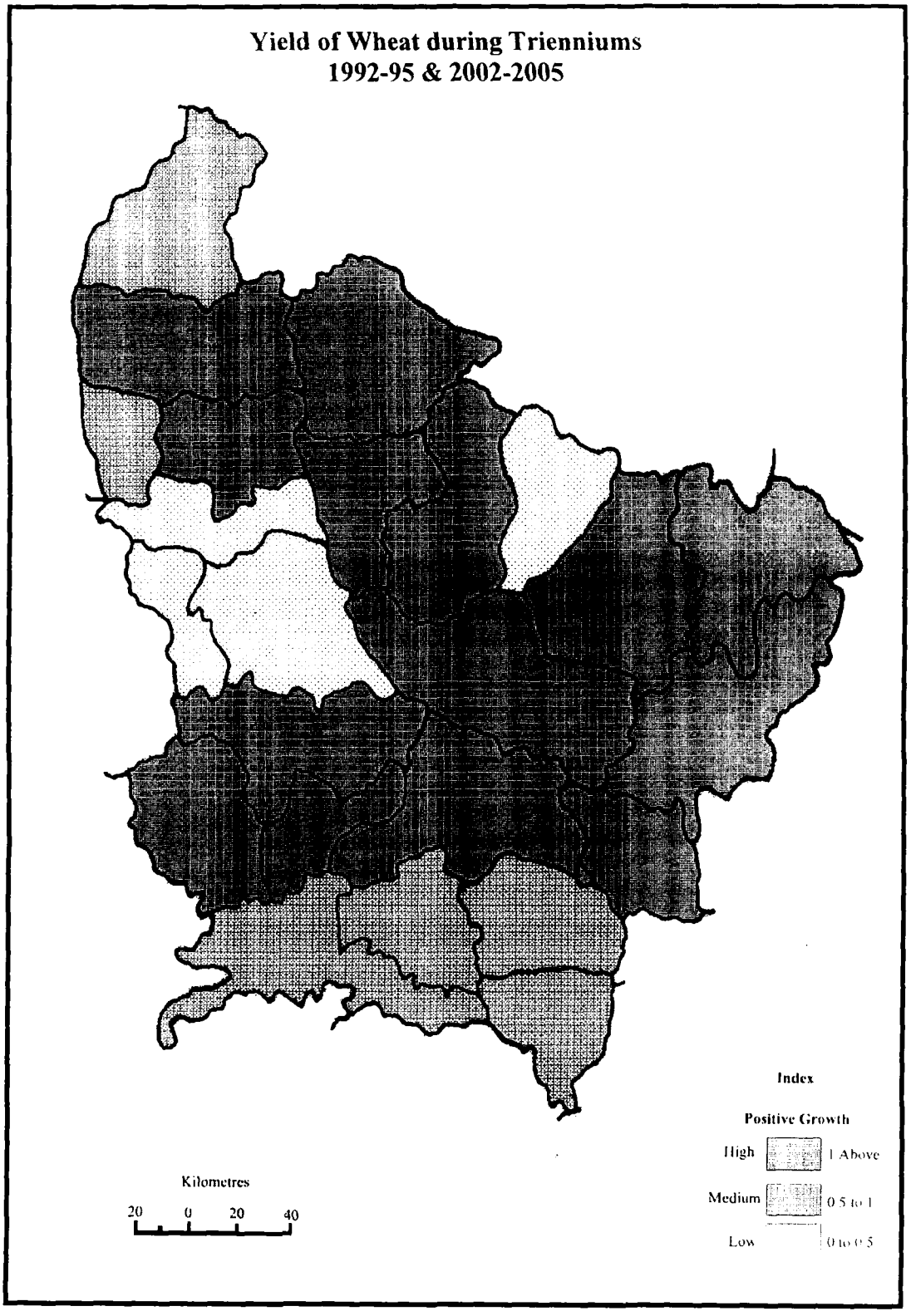
Yield of Wheat during Trienniums
1992-95 & 2002-2005
Index
Positive Growth
High
1 Above
Medium
0.5 to 1
Low
0 to 0.5
Kilometres
20 0 20 40

FIG 3.12

Table 3.13 : Growth of Yield of Barley at District Level during Trienniums 1992-95& 2002-05

S. No.	Districts	Yield (Kg/ha)		Change	Annual growth (%)
		1992-95	2002-05		
1	Saharan Pur	31.93	23.42	-8.51	-2.665
2	Muzaffar Nagar	31.91	23.42	-8.51	-2.665
3	Meerut	31.93	28.42	-3.51	-1.099
4	Baghpat	32.00	28.42	-3.58	-1.118
5	Bulandshahr	32.33	33.89	1.56	0.482
6	Ghaziabad	31.94	28.42	-3.52	-1.101
7	Gautam Budha Nagar	31.92	28.42	-3.5	-1.096
8	Aligarh	28.82	33.61	4.79	1.662
9	Hathras	23.22	28.50	5.28	2.273
10	Mathura	27.43	27.33	-0.06	-0.021
11	Agra	23.25	27.69	4.44	1.909
12	Firozabad	26.12	30.88	4.76	1.822
13	Mainpuri	26.26	28.68	2.42	0.909
14	Etah	22.38	26.92	4.54	0.020
15	Bareilly	13.71	21.88	8.17	5.959
16	Budaun	13.71	21.88	8.17	5.959
17	Shahjahanpur	13.71	21.88	8.17	5.959
18	Pilibhit	13.71	21.88	8.17	5.959
19	Bijnor	18.30	23.40	5.1	2.786
20	Moradabad	18.32	23.40	5.08	2.772
21	Jyotibafule Nagar	18.32	23.40	5.08	2.772
22	Rampur	18.30	23.40	5.08	2.772
23	Farrukhabad	16.95	25.55	8.6	5.073
24	Etawah	19.78	25.55	5.77	2.917

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

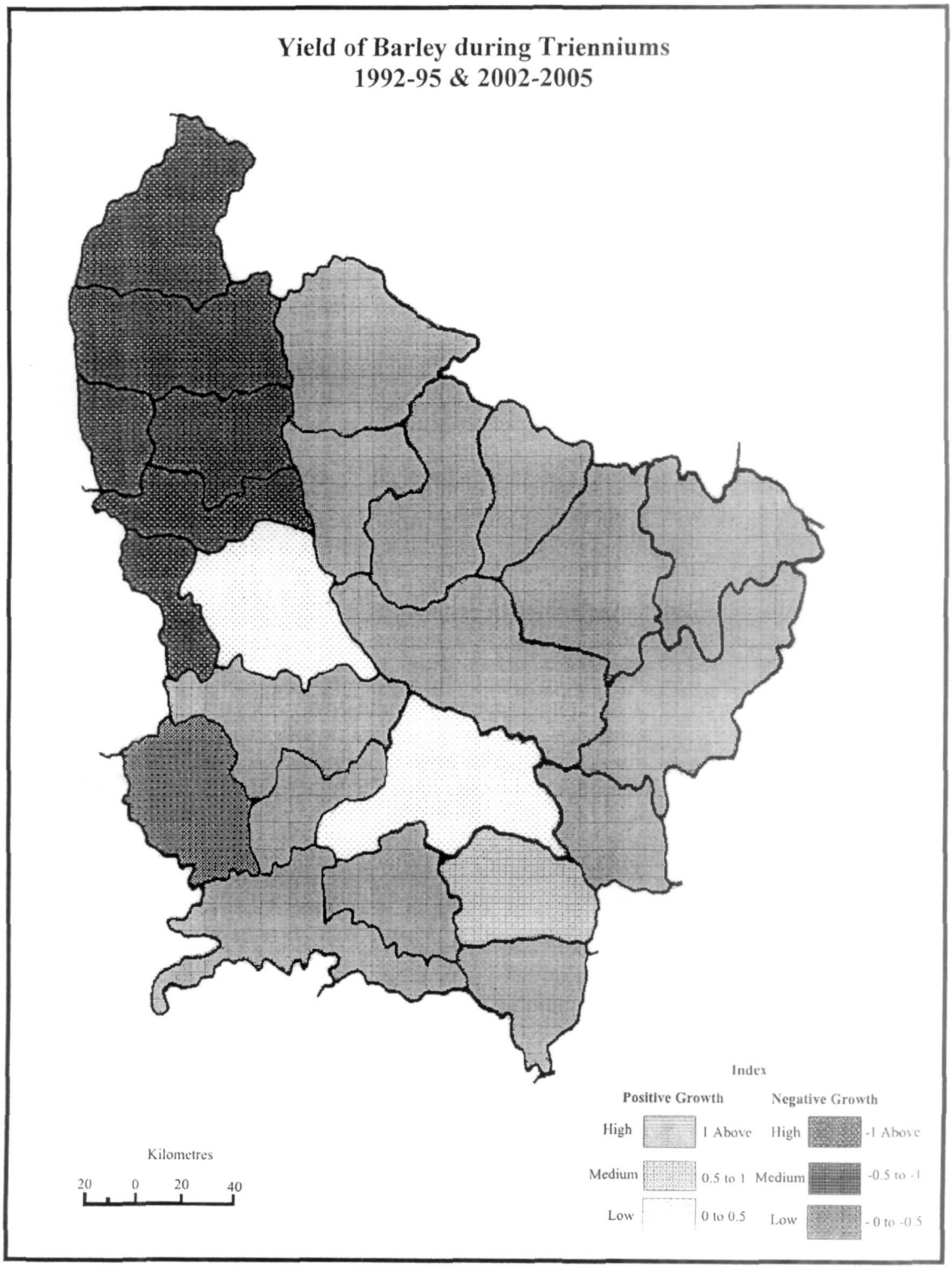
Yield of Barley during Trienniums
1992-95 & 2002-2005
Index
Positive Growth
Negative Growth
High
1 Above
High
-1 Above
Medium
0.5 to 1
Medium
-0.5 to -1
Low
0 to 0.5
Low
- 0 to -0.5
Kilometres
20 0 20 40

FIG. 3.13

The incremental out put of cereals during triennium 1992-95 & 2002-2005 were due to improvements in per hectare productivity (yield). The improvement in yield resulted from advancements in technology, irrigation. and the diversion of low-yielding crops to high value produce.

The western Uttar Pradesh saw a decline not only in yield levels, but in area under cultivation of pulses also (Table 3.16 & fig. 3.16). Therefore, it is not, surprising that out put declined in the western Uttar Pradesh by almost a marginal over 1.00 percent to lower than 1.00 percent per annum during the trienniums 1992-95 & 2002-2005. Aligarh with a negative trend of -4.04 percent per annum and Etah with -3.39 percent per annum categorised under declining rate of trend over the same triennium. During the same trienniums the highest yield kg/ha has been recorded from the districts Pilibhit (4.26) and Bijnor (3.42) therefore, the seventeen districts of the region showing negative rate of trend.

The productivity of pulses has recently started to keep pace with demand. On the other hand, weeds, insects and diseases are responsible for limiting production of pulses. Weed control in irrigated and rain fed agriculture during Kharif is also serious problem and the yield is affected to the extent of 20-60% if not controlled.

The areas where rain fed agriculture dominates, yields are likely to decrease for even small changes in climate. Thus regions and communities that are unable to cope with current climate hazards are also likely to be the most poorly equipped to cope with the adverse impacts of climate change (Brooks and Adger 2003).

Western Uttar Pradesh is the largest producer of food grains. The average productivity of food grains is higher than the national average. Many farmers take two crops a year and some with assured irrigation also take third crop during summer.

Table 3.14: Growth of Yield of Potato at District Level during Trienniums 1992-95 & 2002-05

S.No.	Districts	Yield (Kg/ha)		Change	Annual growth (%)
		1992-95	2002-05		
1	Saharan Pur	232.85	193.08	-39.77	-1.703
2	Muzaffar Nagar	232.85	193.08	-39.77	-1.707
3	Meerut	235.47	244.62	9.15	0.388
4	Baghpat	237.82	224.87	-12.95	0.544
5	Bulandshahr	219.31	196.95	-22.36	-1.019
6	Ghaziabad	243.21	237.56	-5.65	-0.232
7	Gautam Budha Nagar	226.24	224.87	-1.37	-0.060
8	Aligarh	170.25	250.56	80.31	4.717
9	Hathras	208.15	314.55	113.4	5.447
10	Mathura	216.03	271.1	55.07	2.549
11	Agra	232.74	273.29	39.55	1.699
12	Firozabad	235.53	245.03	9.5	0.403
13	Mainpuri	202.08	229.53	27.45	1.358
14	Etah	143.66	217.84	74.18	5.163
15	Bareilly	146.99	176.33	29.34	1.996
16	Budaun	177.46	225.36	47.9	2.699
17	Shahjahanpur	166.92	198.72	31.8	1.905
18	Pilibhit	146.99	213.95	66.96	4.555
19	Bijnor	172.05	265.80	93.75	5.448
20	Moradabad	190.48	284.69	94.21	4.945
21	Jyotibafule Nagar	144.59	203.41	58.82	4.068
22	Rampur	189.57	282.50	92.93	4.902
23	Farrukhabad	189.13	264.92	75.79	4.007
24	Etawah	174.68	246.26	71.58	4.097

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

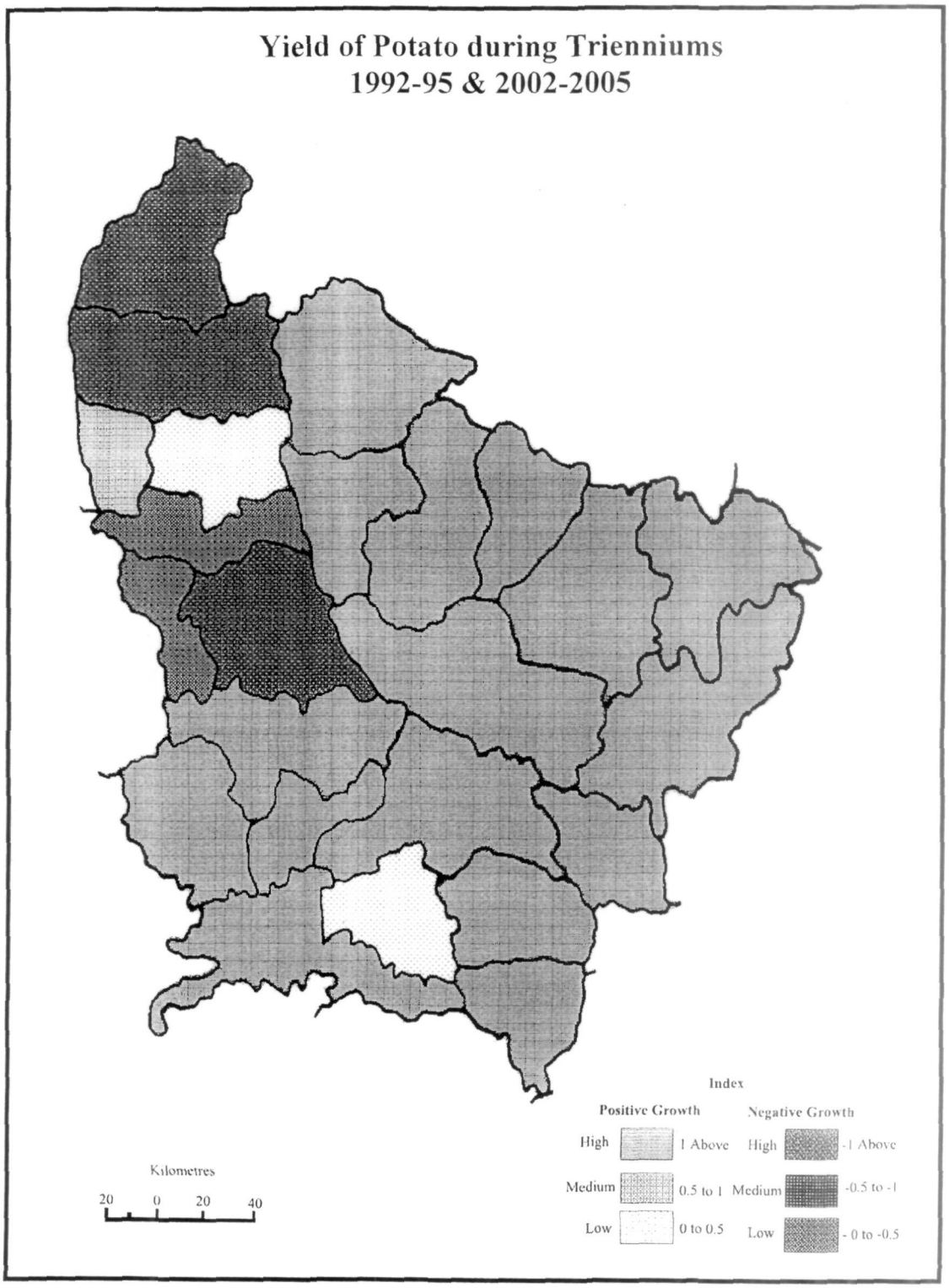
Yield of Potato during Trienniums
1992-95 & 2002-2005
Index
Positive Growth
Negative Growth
High
1 Above
High
-1 Above
Medium
0.5 to 1
Medium
-0.5 to -1
Low
0 to 0.5
Low
- 0 to -0.5
Kilometres
20
0
20
40

Fig 3.14

Table 3.15: Growth of Yield of Total Cereal at District Level during Trienniums 1992-95 & 2002-05

S.No.	Districts	Yield (Kg/ha)		Change	Annual growth (%)
		1992-95	2002-05		
1	Saharan Pur	24.22	25.71	1.49	0.615
2	Muzaffar Nagar	28.85	32.09	3.24	1.123
3	Meerut	31.00	34.11	3.11	1.003
4	Baghpat	31.51	35.17	3.66	1.161
5	Bulandshahr	27.49	29.86	2.37	0.862
6	Ghaziabad	32.08	43.41	11.33	2.609
7	Gautam Budha Nagar	28.13	28.56	0.43	0.152
8	Aligarh	22.72	26.54	3.82	1.681
9	Hathras	22.50	27.21	4.71	2.093
10	Mathura	24.99	28.91	3.92	1.568
11	Agra	22.05	25.80	3.75	1.700
12	Firozabad	21.16	23.69	1.73	0.782
13	Mainpuri	23.16	24.09	0.93	0.401
14	Etah	20.46	23.07	2.61	1.275
15	Bareilly	19.89	22.92	3.03	1.523
16	Budaun	18.7	22.29	3.59	1.919
17	Shahjahanpur	24.14	27.61	3.47	1.437
18	Pilibhit	25.03	28.61	3.58	1.430
19	Bijnor	25.19	27.16	1.97	0.787
20	Moradabad	24.25	25.06	0.84	0.346
21	Jyotibafule Nagar	23.98	25.79	1.81	0.754
22	Rampur	26.56	26.78	0.22	0.082
23	Farrukhabad	21.84	25.32	3.48	1.593
24	Etawah	22.52	24.89	2.37	1.052

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

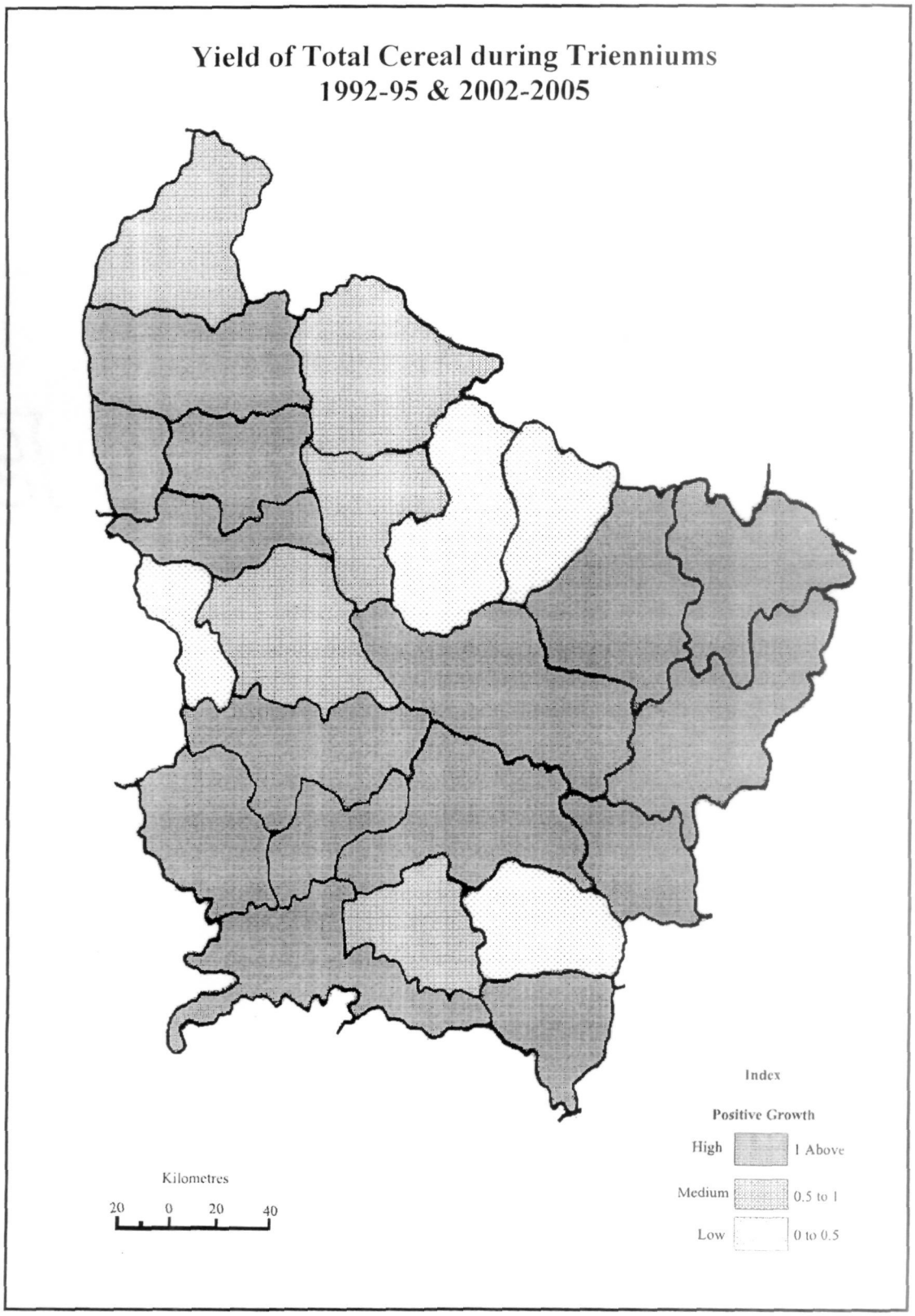
Yield of Total Cereal during Trienniums
1992-95 & 2002-2005
Index
Positive Growth
High
1 Above
Medium
0.5 to 1
Low
0 to 0.5
Kilometres
20 0 20 40

Fig. 3.15

Table 3.17 & fig. 3.17 indicate a positive growth rate of yield kg/ha of total food grains in almost all districts of western Uttar Pradesh during trienniums 1992-95 & 02-2005. Except a few one, large number of districts show over 1.00 percent growth rate per annum. The highest growth rate with 23.20 percent per annum has been recorded from the district Bijnor. Moradabad with 17.61 percent per annum and Jyotebankfule Nagar with 17.02 percent per annum growth rate lie under the category of high growth rate. Wheat and rice, two major crops, largely contributed in the production of total food grains. The introduction of HYVs was supported through the extension of irrigation, fertilizers, better agricultural techniques, water management, plant protection and storage and marketing infrastructure largely contributed to percentage annual growth. This highlights the importance of modern inputs and their role in raising value productivity and also by bringing about changes in cropping patterns.

Kharif oil seeds account for the maximum percent of total oil seeds area and contributed to the maximum of total oil seeds production. Important Kharif oil seeds are groundnut, soyabean, sesamum, and castor. Castor and linseed are used for industrial oils and the rest are essential edible oils for the Indian diet, namely ground nuts, soyabean, sunflower, rape seed and mustard.

Sun flower is increasing, satisfying a need for unsaturated fats, while in some limited area soyabean have become a very profitable crop.

The percent annual growth of total oil seeds as (Table 3.18 & Fig. 3.18) indicates a fluctuation in growth rate from negative to positive one. The largest growth rate per annum has been recorded from the districts Pilibhit, Mathura, Aligarh, Hathras Budaun and Etah. The districts under low rate of growth per annum in percentage are Meerut, Muzaffarnagar, Gautam Budha Nagar, Bulandshahr, Baghpat and

Table 3.16: Growth of Yield of Total Pulses at District Level during Trienniums 1992-95 & 2002-05

S.No.	Districts	Yield (Kg/ha)		Change	Annual growth (%)
		1992-95	2002-05		
1	Saharan Pur	6.38	5.54	-0.84	-1.316
2	Muzaffar Nagar	7.01	5.64	-1.37	-2.429
3	Meerut	9.38	8.05	-1.33	-1.417
4	Baghpat	8.83	7.68	-1.15	-1.302
5	Bulandshahr	9.66	8.65	-1.01	-1.045
6	Ghaziabad	9.35	8.80	-0.55	-0.588
7	Gautam Budha Nagar	14.62	9.08	-5.54	-3.789
8	Aligarh	12.52	7.45	-5.07	-4.049
9	Hathras	9.62	8.62	-1.00	-1.039
10	Mathura	8.03	7.60	-0.43	-0.535
11	Agra	13.28	11.52	-1.76	-1.325
12	Firozabad	11.77	10.28	-1.49	-1.265
13	Mainpuri	10.64	10.72	0.08	0.075
14	Etah	11.16	7.39	-3.79	-3.396
15	Bareilly	7.12	6.90	-0.22	-0.308
16	Budaun	8.02	7.53	-0.49	-0.610
17	Shahjahanpur	6.11	6.75	0.64	1.047
18	Pilibhit	5.16	7.36	2.2	4.263
19	Bijnor	7.12	9.56	2.44	3.426
20	Moradabad	7.37	7.9	0.53	0.719
21	Jyotibafule Nagar	8.5	7.44	-1.06	-1.247
22	Rampur	8.96	10.73	1.77	1.975
23	Farrukhabad	9.27	10.18	0.91	0.981
24	Etawah	12.59	12.48	-0.11	-0.087

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

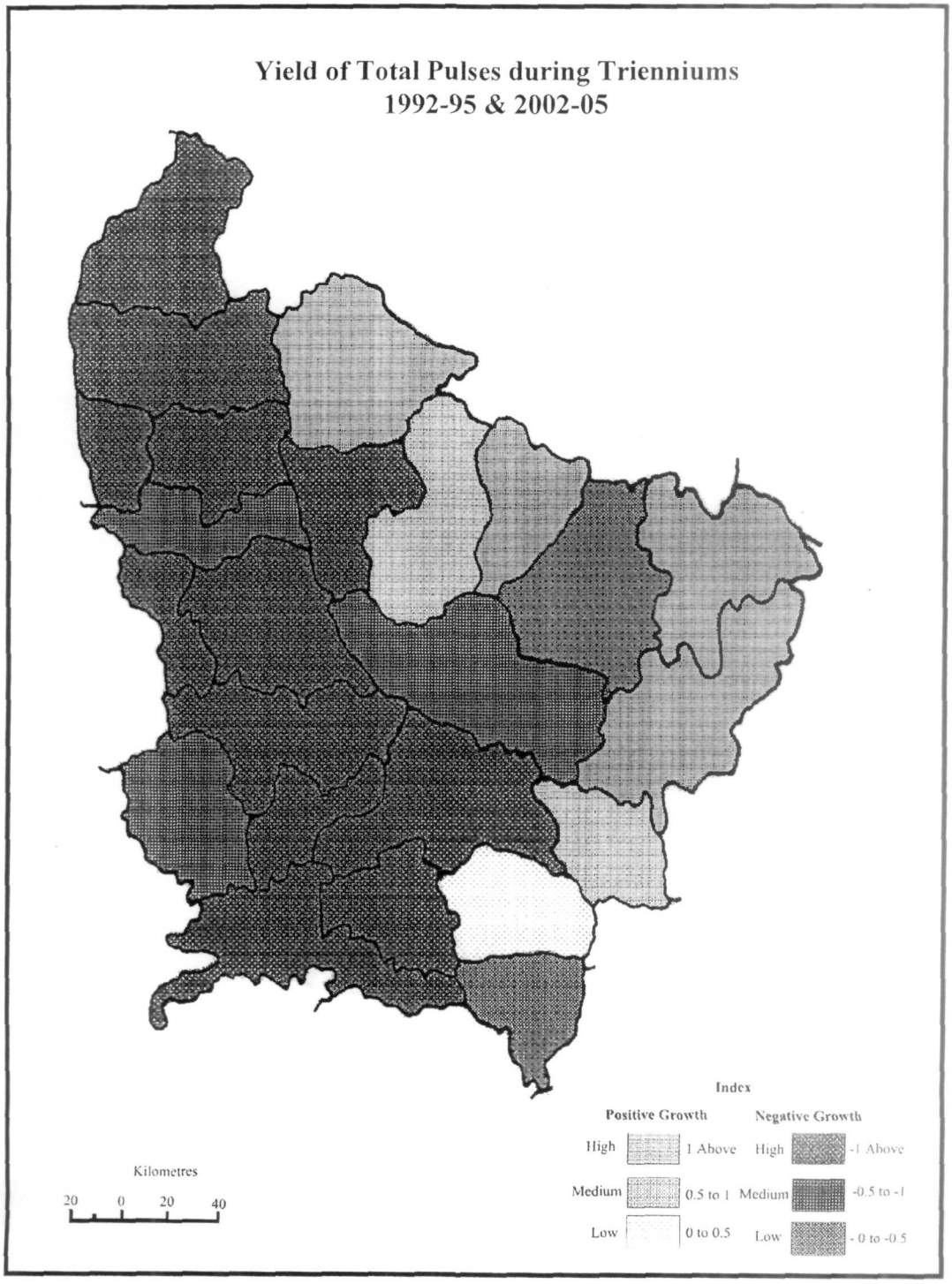
Yield of Total Pulses during Trienniums
1992-95 & 2002-05
Index
Positive Growth
Negative Growth
High
1 Above
High
-1 Above
Medium
0.5 to 1
Medium
-0.5 to -1
Low
0 to 0.5
Low
- 0 to -0.5
Kilometres
20 0 20 40

FIG. 3.16

Table 3.17: Growth of Yield of Total Food Grains at District Level during Trienniums 1992-95 & 2002-05

S.No.	Districts	Yield (Kg/ha)		Change	Annual growth (%)
		1992-95	2002-05		
1	Saharan Pur	23.35	24.88	1.53	0.655
2	Muzaffarnagar	27.62	31.09	3.47	1.256
3	Meerut	29.84	33.23	3.39	1.136
4	Baghpat	30.55	34.42	3.87	1.266
5	Bulandshahr	26.21	28.58	2.37	0.904
6	Ghaziabad	28.65	31.33	2.68	0.935
7	Gautam budha Nagar	27.13	27.83	0.7	0.258
8	Aligarh	21.06	25.24	4.18	1.935
9	Hathras	20.72	26.1	5.38	2.596
10	Mathura	24.19	28.52	4.33	1.789
11	Agra	21.30	25.11	3.81	1.788
12	Firozabad	21.15	23.24	2.09	0.988
13	Mainpuri	22.25	23.58	1.33	0.597
14	Etah	19.26	22.38	3.12	1.619
15	Bareilly	19.00	22.05	3.05	1.605
16	Budaun	18.07	21.12	3.05	1.687
17	Shahjahanpur	22.64	26.70	4.06	1.793
18	Pilibhit	24.32	28.19	3.87	1.591
19	Bijnor	8.03	26.66	18.63	23.200
20	Moradabad	8.78	24.25	15.47	17.619
21	Jyotibafule Nagar	9.31	25.16	15.85	17.024
22	Rampur	26.08	26.34	0.26	0.099
23	Farrukhabad	20.68	24.45	3.77	1.823
24	Etawah	21.15	23.83	2.68	1.267

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

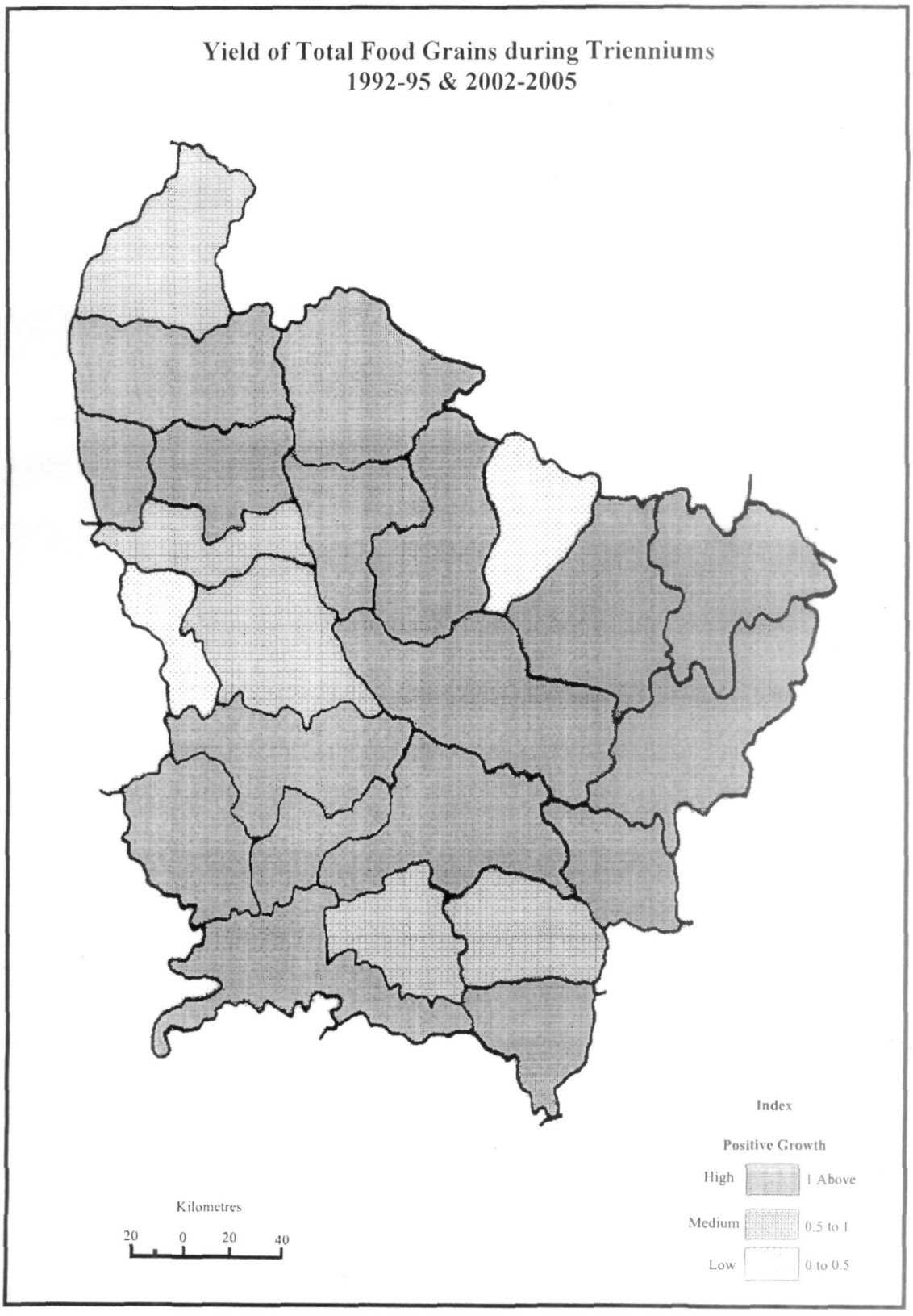
Yield of Total Food Grains during Trienniums
1992-95 & 2002-2005
Index
Positive Growth
High
1 Above
Medium
0.5 to 1
Low
0 to 0.5
Kilometres
20 0 20 40

FIG. 3.17

Saharanpur. The lowest negative (–2.70) percent annual rate of trend has been recorded from the district Meerut.

The Seeds and weeds are also a serious problem for oil seeds, if spraying is not used properly; they largely affect the level of productivity.

At the same time the slower progress has been made in improving yields of oil seeds which provide the main edible oils. This crop is largely confined to poorer land and is monsoon dependent.

Paddy is one of the major food crops in the western Uttar Pradesh, since it is a predominant Kharif and Rabi Crop. Table 3.19 & Fig. 3.19 reflects the percent annual growth which is either in virtual stagnation or there is very little growth. Further, production of Paddy or total rice has been dipping with fluctuation in rainfall. There is urgent need to take a fresh look at this situation. It will be futile to expect the farmers to continue to grow paddy when their return on investment is negative. This goes to illustrate that actual returns on investment from farming is negative for a large number of small and marginal farmers.

The stagnation in the production of major crops in Uttar Pradesh may be also due to the loss of soil nutrients, after decades of intensive cultivation and fertilizer use.

Aligarh, Baghpat, Muzaffarnagar, Ghaziabad, Bareilly, and Shahjahanpur, fall under the range of medium category. The poor and negative rate of trend of total rice has been reported from the districts of Etah, Mathura, Saharanpur, Jyotibafule Nagar, Rampur, Mainpuri. From the districts Bulandshahr, Firozabad and Bareilly the trend of growth is recorded up to the level of satisfaction.

Table 3.18 : Growth of Yield of Total Oilseed at District Level during Trienniums 1992-95 & 2002-05

S.No.	Districts	Yield (Kg/ha)		Change	Annual growth (%)
		1992-95	2002-05		
1	Saharan Pur	9.57	9.67	0.1	0.104
2	Muzaffar Nagar	10.89	9.54	-1.35	-1.239
3	Meerut	14.7	10.72	-3.98	-2.707
4	Baghpat	10.89	10.67	-0.22	-0.202
5	Bulandshahr	10.66	10.26	-0.4	-0.375
6	Ghaziabad	10.35	10.69	0.34	0.328
7	Gautam Budha Nagar	11.68	10.59	-1.09	-0.933
8	Aligarh	9.36	12.06	2.7	2.884
9	Hathras	9.02	11.61	2.59	2.87
10	Mathura	9.59	12.39	2.8	2.919
11	Agra	11.86	12.66	0.8	0.674
12	Firozabad	10.29	11.19	0.9	0.874
13	Mainpuri	9.29	11.06	1.77	1.905
14	Etah	8.87	11.26	2.39	2.694
15	Bareilly	5.87	7.01	1.14	1.942
16	Budaun	7.62	9.73	2.11	2.769
17	Shahjahanpur	5.58	5.85	0.27	0.483
18	Pilibhit	4.88	6.34	1.46	2.991
19	Bijnor	8.03	9.33	1.3	1.618
20	Moradabad	8.78	9.29	0.51	0.580
21	Jyotibafule Nagar	9.31	9.44	0.13	0.139
22	Rampur	9.31	11.65	2.34	2.513
23	Farrukhabad	9.78	11.25	1.47	1.503
24	Etawah	10.71	11.52	0.81	0.756

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

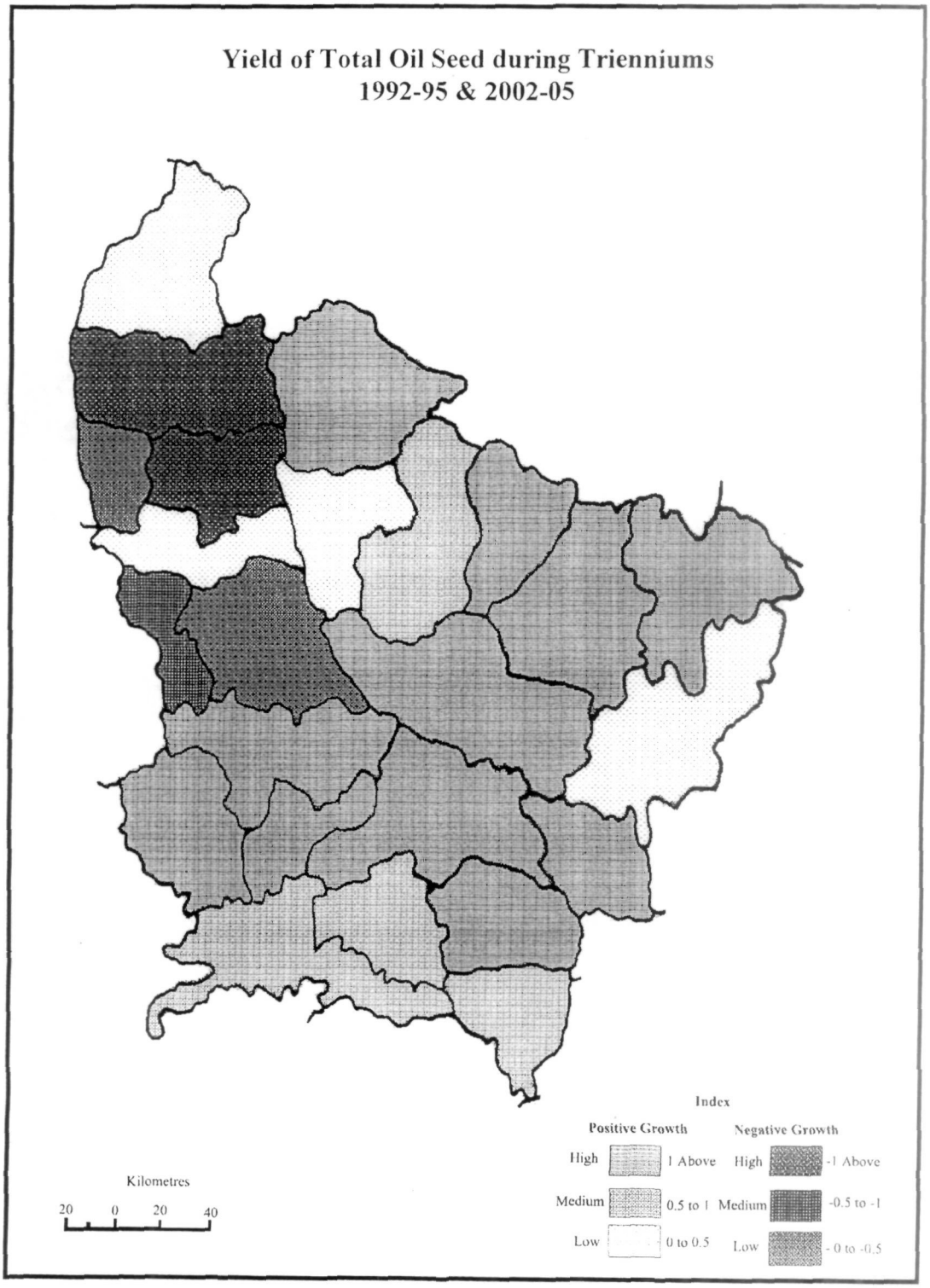
Yield of Total Oil Seed during Trienniums
1992-95 & 2002-05
Index
Positive Growth
Negative Growth
High
1 Above
High
-1 Above
Medium
0.5 to 1
Medium
-0.5 to -1
Low
0 to 0.5
Low
- 0 to -0.5
Kilometres
20 0 20 40

FIG. 3.18

Table 3.19: Growth of Yield of Total Rice at District Level during Trienniums 1992-95 & 2002-05

S.No.	Districts	Yield (Kg/ha)		Change	Annual growth (%)
		1992-95	2002-05		
1	Saharan Pur	23.26	22.01	-1.25	-0.537
2	Muzaffar Nagar	24.62	24.80	0.18	0.073
3	Meerut	23.03	23.53	0.5	0.217
4	Baghpat	24.91	25.17	0.26	0.104
5	Bulandshahr	18.29	23.51	5.22	2.854
6	Ghaziabad	23.91	23.78	-0.03	-0.012
7	Gautam Budha Nagar	22.11	22.69	0.58	0.262
8	Aligarh	19.98	20.26	0.28	0.140
9	Hathras	18.03	19.17	1.14	0.632
10	Mathura	22.56	21.26	-1.3	-0.576
11	Agra	19.52	19.99	0.47	0.240
12	Firozabad	17.52	22.05	4.53	2.585
13	Mainpuri	19.79	19.12	-0.67	-0.338
14	Etah	19.16	17.9	-1.26	-0.657
15	Bareilly	18.41	22.77	4.36	2.368
16	Budaun	16.58	16.41	-0.17	-0.102
17	Shahjahanpur	22.68	22.03	-0.65	-0.286
18	Pilibhit	24.85	26.77	1.92	0.772
19	Bijnor	26.68	27.10	0.42	0.157
20	Moradabad	23.56	23.16	-0.4	-0.169
21	Jyotibafule Nagar	23.69	22.64	-1.05	-0.443
22	Rampur	22.90	21.96	-0.94	-0.410
23	Farrukhabad	19.19	20.13	0.94	0.489
24	Etawah	21.45	24.66	3.21	1.496

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

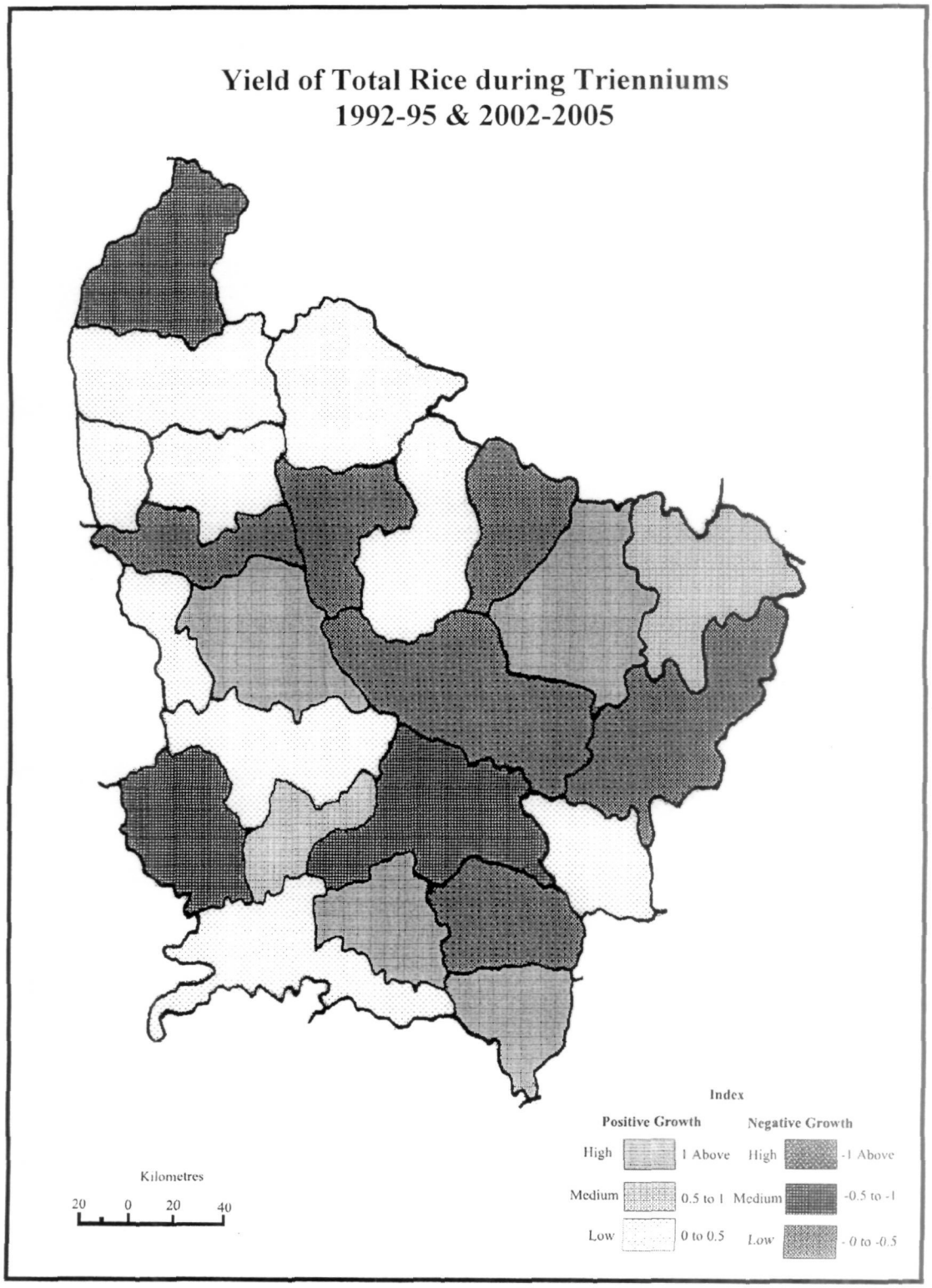
Yield of Total Rice during Trienniums
1992-95 & 2002-2005
Index
Positive Growth
Negative Growth
High
1 Above
High
-1 Above
Medium
0.5 to 1
Medium
-0.5 to -1
Low
0 to 0.5
Low
-0 to -0.5
Kilometres
20 0 20 40

FIG. 3.19

Further, cost of agriculture has increased many a time during the last few decades and is still increasing but the total agricultural production has now become stagnant. The difference of cost and price is decreasing and for small farmers, farming is now gradually becoming non-viable. Organized farming with close contact to market may be viable for big land holders but for small and land less farmers, this seems to be more and more difficult.

Rice yields are constrained by many factors but insects, weeds and diseases are important to reducing productivity.

Growth rate of maize yield took a negative turn in almost more than half districts in western Uttar Pradesh (Table 3.20 & fig 3.21). The western Uttar Pradesh saw a decline not only in yield levels, but in area under cultivation of maize also. The highest declining rate of trend per annum of maize in a tune of more than –2.00 percent has been recorded from the districts Baghpat, Gautam Budha Nagar and Jyotifule Nagar. The highest annual rate of growth (6.19 percent) per annum has been recorded from the district of Mathura.

One year of crop failure could wipe a small farmer out of business and thus, instead of trying something new, farmers play it safe by relying heavily on producing wheat and rice that benefited them from the assured procurement of these food grains by the food cooperation of India. Even there is reduction in consumption of maize which is attributed to phenomenon of dietary diversification which involves structural shifts in demand of horticultural and live stock feed.

In the context of study area it is clear that the returns on investment to the farmer are declining. In case of maize and paddy, the minimum support price is less than the cost of production.

Table 3.20: Growth of Yield of Total Maize at District Level during Trienniums 1992-95 & 2002-05

S.No.	Districts	Yield (Kg/ha)		Change	Annual growth (%)
		1992-95	2002-05		
1	Saharan Pur	14.27	12.49	-1.78	-1.247
2	Muzaffar Nagar	15.52	12.63	-2.89	-1.862
3	Meerut	15.53	12.48	-3.05	-1.963
4	Baghpat	15.93	12.08	-3.85	-2.416
5	Bulandshahr	17.63	16.47	-1.16	-0.657
6	Ghaziabad	16.64	14.13	-2.15	-1.508
7	Gautam Budha Nagar	16.76	13.05	-3.71	-2.213
8	Aligarh	16.16	15.06	-1.1	-0.680
9	Hathras	14.22	15.46	1.24	0.872
10	Mathura	9.96	16.13	6.17	6.194
11	Agra	14.18	15.97	1.79	1.262
12	Firozabad	15.02	18.26	3.24	2.157
13	Mainpuri	19.27	17.56	-1.71	-0.887
14	Etah	17.06	13.88	-3.18	-1.864
15	Bareilly	11.62	14.75	3.13	2.693
16	Budaun	12.52	15.33	2.81	2.244
17	Shahjahanpur	11.57	13.71	2.14	1.849
18	Pilibhit	12.14	14.80	2.66	2.191
19	Bijnor	13.27	12.73	-0.54	-0.406
20	Moradabad	13.39	12.5	-0.89	-0.664
21	Jyotibafule Nagar	13.76	10.70	-3.06	-2.223
22	Rampur	11.27	11.64	-0.37	-0.328
23	Farrukhabad	16.01	16.86	0.85	0.530
24	Etawah	15.66	19.1	3.44	2.196

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

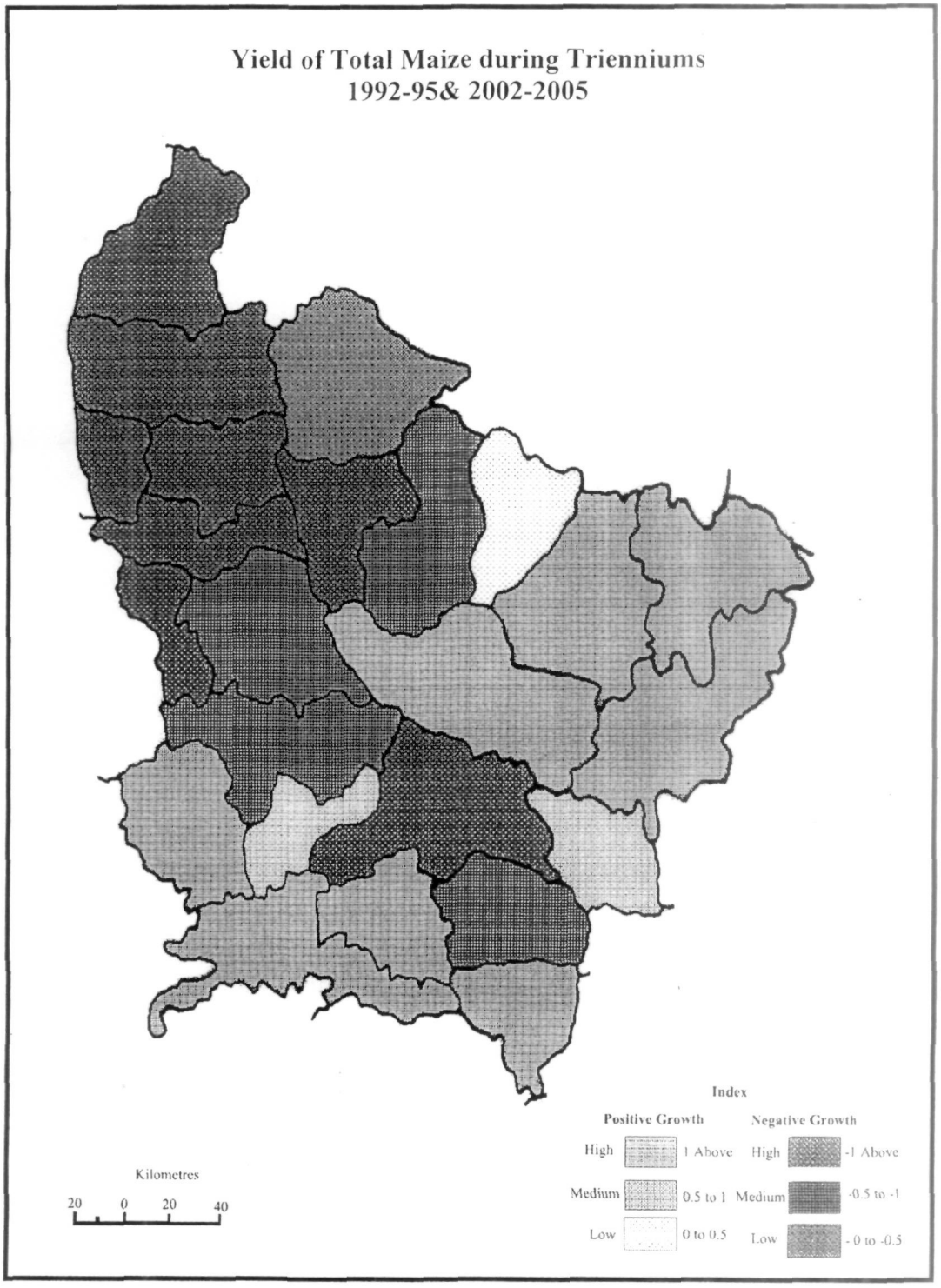
Yield of Total Maize during Trienniums
1992-95& 2002-2005
Index
Positive Growth
Negative Growth
High
1 Above
High
-1 Above
Medium
0.5 to 1
Medium
-0.5 to -1
Low
0 to 0.5
Low
- 0 to -0.5
Kilometres
20 0 20 40

FIG. 3.20

Table 3.21: Growth of Yield of Onion at District Level during Trienniums 1992-95 & 2002-05

S.No.	Districts	Yield (Kg/ha)		Change	Annual growth (%)
		1992-95	2002-05		
1	Saharan Pur	123.92	104.73	-19.19	-1.548
2	Muzaffar Nagar	123.92	104.73	-19.19	-1.548
3	Meerut	155.88	104.73	-51.15	-3.281
4	Baghpat	104.73	84.33	-20.4	-2.419
5	Bulandshahr	123.92	104.73	-19.19	-1.548
6	Ghaziabad	124.19	104.73	-19.46	-1.566
7	Gautam Budha Nagar	83.21	64.78	-18.43	-2.214
8	Aligarh	129.58	104.73	-24.85	-1.917
9	Hathras	131.17	104.73	-26.44	-2.015
10	Mathura	129.02	104.73	-24.29	-1.882
11	Agra	129.02	104.73	-24.29	-1.882
12	Firozabad	129.02	104.73	-24.29	-1.882
13	Mainpuri	129.02	104.73	-24.29	-1.882
14	Etah	129.02	104.73	-24.29	-1.882
15	Bareilly	139.94	105.78	-34.1	-2.441
16	Budaun	117.92	105.78	-12.1	-1.029
17	Shahjahanpur	140.11	105.78	-34.33	-2.450
18	Pilibhit	140.11	104.73	-34.33	-2.450
19	Bijnor	124.59	104.73	-19.86	-1.594
20	Moradabad	124.67	104.73	-19.94	-1.599
21	Jyotibafule Nagar	125.19	104.73	-20.46	-1.634
22	Rampur	124594	104.73	-19.86	-1.594
23	Farrukhabad	122.17	105.78	-16.39	-1.341
24	Etawah	119.44	105.78	-13.66	-1.143

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

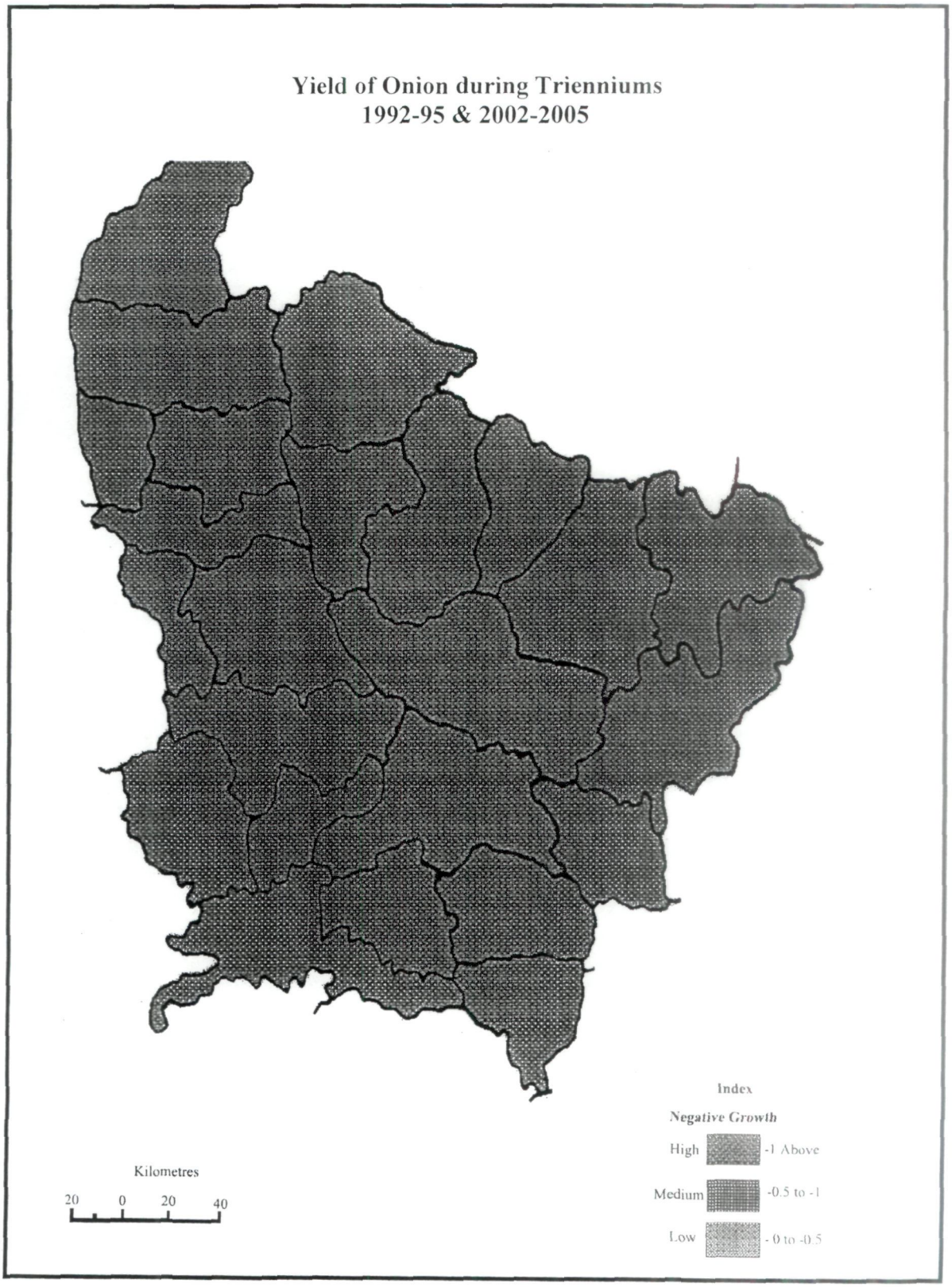

FIG. 3.21

Growth rate of onion yield took a surprising negative turn in all districts of western Uttar Pradesh during trienniums 1992-95 & 2002-05 (Table 3.21 & Fig. 3.21). The negative rate of trend varies from a highest over –3.00 percent to a lowest over 1.00 percent per annum.

The worst impact of agricultural land is that the soil is becoming poisonous and its fertility is decreasing. Further, types and quantity of insets are increasing which are affecting the productivity of the region. The small marginal and landless farmers are facing problems like; availability of seeds and fertilizers on time. Quality of seeds and fertilizers is always questionable and their prices are rising rapidly and regularly. The area under onion cultivation and production is also decreasing at much higher rate.

Government is regularly reducing and with drawing subsidies and other facilities to the farmers under pressures of liberalized economic policies and globalization. This again is resulting in increasing the cost of input for agriculture and adversely affecting the agricultural growth and farmers.

Despite the rise in the cost of all inputs like seeds, power, fertilizers, pesticides and water, farmers are selling their products today at prices that are in reality half. Returns on investment are reducing further. This goes to illustrate that actual returns on investment from farming is negative for a large number of small and marginal farmers.

A fact which we reminded of in the years 2002 and 2004 when due to failure of monsoon the deficient rainfall has been received in the western region of Uttar Pradesh which plummeted the agricultural growth rate over all.

Sugarcane is one of the main crops of the western Uttar Pradesh. But here irregular payment from sugar mills is a very big problem,

Table 3.22: Growth of Yield of Sugarcane at District Level during Trienniums 1992-95 & 2002-05

S.No.	Districts	Yield (Kg/ha)		Change	Annual growth (%)
		1992-95	2002-05		
1	Saharan Pur	658.13	608.78	-49.35	-0.749
2	Muzaffar Nagar	660.24	676.58	16.34	0.247
3	Meerut	589.17	649.82	60.65	1.029
4	Baghpat	615.74	547.72	31.98	0.519
5	Bulandshahr	598.17	594.4	-3.77	-0.063
6	Ghaziabad	643.28	638.10	-5.18	-0.080
7	Gautam Budha Nagar	622.6	627.48	4.88	0.078
8	Aligarh	603.66	567.46	-36.2	0.599
9	Hathras	545.37	519.22	-265.15	-0.479
10	Mathura	554.64	503.22	-51.42	-0.927
11	Agra	551.16	519.23	-31.93	-0.579
12	Firozabad	623.63	519.23	-104.4	-1.674
13	Mainpuri	408.41	519.23	110.82	2.713
14	Etah	551.92	480.49	-71.43	-1.294
15	Bareilly	615.22	567.88	-47.34	-0.769
16	Budaun	580.84	588.84	8.00	0.137
17	Shahjahanpur	577.73	544.56	-33.17	-0.574
18	Pilibhit	618.54	561.86	-56.68	-0.916
19	Bijnor	627.92	629.92	2.00	0.031
20	Moradabad	553.81	560.70	6.89	0.124
21	Jyotibafule Nagar	620.97	68.69	-12.28	0.197
22	Rampur	583.85	610.76	26.91	0.460
23	Farrukhabad	561.54	513.89	-29.65	-0.528
24	Etawah	429.99	503.83	10.84	0.219

Source: Agricultural bulletin of directorate of agriculture, Lucknow, U.P.

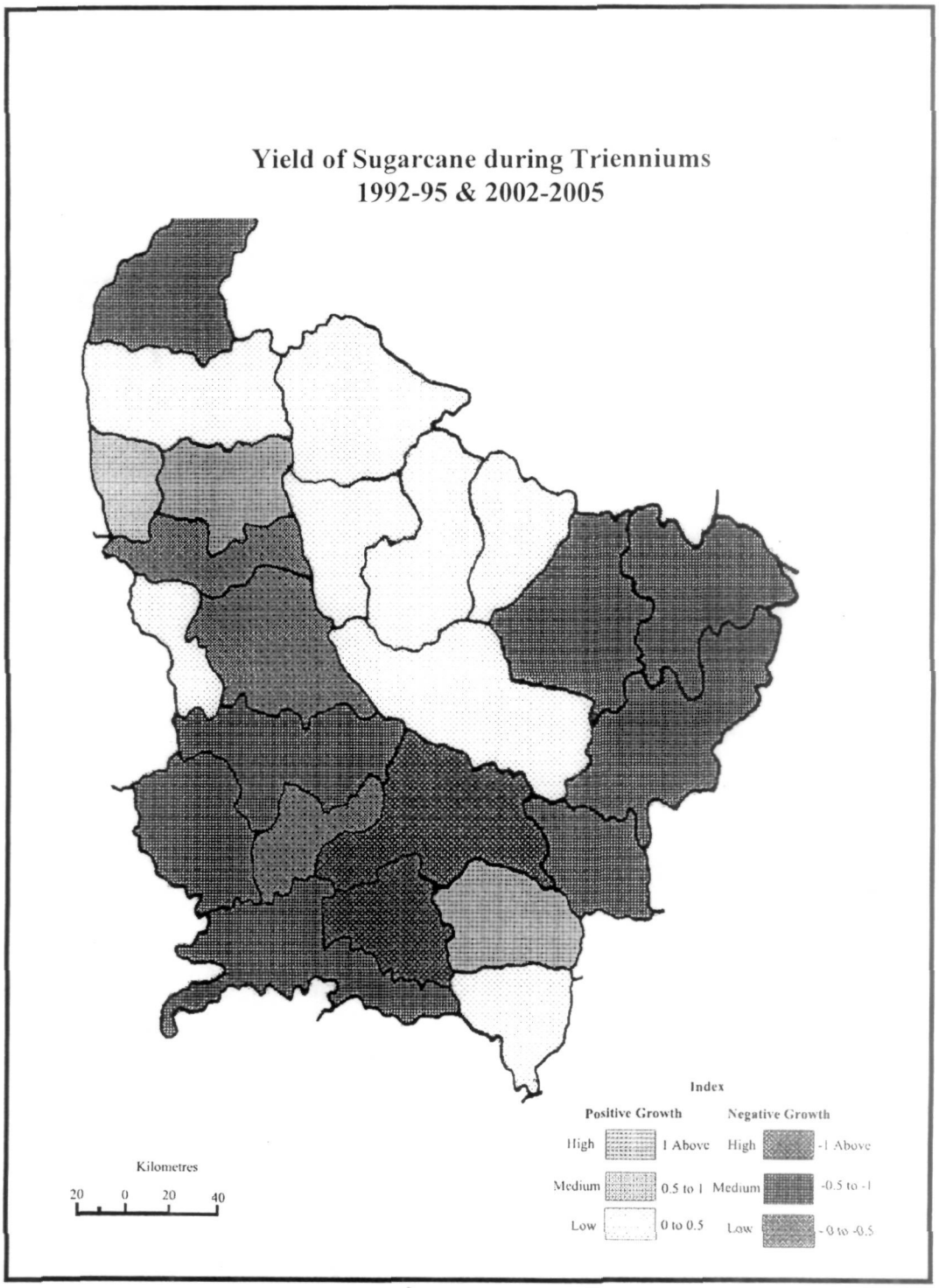
Yield of Sugarcane during Trienniums
1992-95 & 2002-2005
Index
Positive Growth
Negative Growth
High
1 Above
High
-1 Above
Medium
0.5 to 1
Medium
-0.5 to -1
Low
0 to 0.5
Low
-0 to -0.5
Kilometres
20 0 20 40

Fig. 3.22

(Table 3.22 & Fig. 3.22), the trend of growth is evident which show either a marginal or stagnant increase in yield kg/ha or there is a negative rate of trend in half districts of the study area. Mainpuri with 2.71 percent annual growth is holding the position of highest rate of growth in study area. The highest rate of growth per annum has been recorded from the districts Mainpuri (2.71 percent) and Meerut (1.02 percent).

The western Uttar Pradesh is also one of the important producers of sugarcane. In 1995-96 it produced over 80 million tons of sugarcane.

The western Uttar Pradesh witnessed a steep decline in Sugar cane production. The state share has also declined from the nation's total production of sugarcane. The farmers had put in their best and increased production of cash crops specially sugarcane but were unable even to recover the cost price. The absence of good market also causes grave challenge to the farmers.

Standing sugarcane crops on thousands of acres were burnt because there were no buyers and the field needed to be cleared for the next crop.

Other than these the farmers are facing problems in selling their produce. Almost at all places, cheating, corruption and conspiracies created by the nexus of big farmers, businessmen and politicians are quite common. Small farmers have general complaints in purchase of their crops at below the minimum support price at government purchase centres or they are compelled to sale their crops on bare minimum prices in open market or to the local factories where there is delay in payment. All these difficulties are generating disinterest among the farmers.

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Chapter -4

Socio-Economic Development

Development implies a change for better which is both an economic and social progress. The concept of development indicates a positive change in out put as structural changes in a growing economy. The development is the reflection of combined effect of a bundle of socio-economic attributes in a given area. The rate of development does not ubiquitous throughout the region but varies. In the present study, the researcher has made an effort to examine the regional pattern of socio-economic and agro-socio-economic development.

On the basis of Z-score a composite index of each district has been marked out and calculated, in order to reach out standardization, the raw data for each variable has been computed into standard scores. The scores measure the departure of individual observation from the arithmetic mean of all observations expressed in a comparable form. This means it becomes a linear transformation of the original data.

The formula involved is

$$zi = \frac{xi - \bar{x}}{SD}$$

Where zi, is the standard score,

xi, is the original or individual values for observation i,

$\bar{x}$, is the mean of variable, and

SD is the standard deviation (δ)

The standard score additive model has been used to develop a composite, economic, social and agro-socio-economic indicators for each set of variables and a general indicator including all criteria and variables. The final result of this transformed z-score model donates 'zero' which indicates average performance and unity (+ or -) represents one standard deviation in either direction. Plus (+) and minus (-) indicates high and low values. For analyzing the levels of development, two point of time i.e., 1995 & 2005 have been taken into consideration.

Table 4.1: Level of Development of Education of Districts Ranked on the Basis of Composite Index for the year 1995.

	District	EDUCATION								Composite Z-Score education
		No. of Schools/ Per lakh Population				Teacher pupil Ratio				
		Junior Basic School	Senior Basic School	Higher Secondary School	Degree College	Junior Basic School	Senior Basic School	Higher Secondary School	Degree College	
1	Saharanpur	0.121	0.069	0.923	-0.548	0.035	-0.062	0.126	0.620	0.160
2	Muzaffar Nagar	0.888	-0.059	-0.977	-0.239	0.687	0.075	-0.085	-0.742	-0.056
3	Meerut	0.837	-0.759	2.757	0.151	1.616	1.595	2.020	-0.278	0.992
4	Baghpat	-0.645	-1.534	1.381	-0.474	0.147	-0.854	-0.997	-2.099	-0.634
5	Bulandshahar	0.735	0.282	-0.453	0.348	1.177	2.019	0.897	0.831	0.729
6	Ghaziabad	0.275	-1.099	-0.322	-0.778	-0.129	-0.056	1.038	-0.014	-0.135
7	Gautam Budha Nagar	-1.156	-2.450	-1.239	-1.394	-2.438	-0.848	-1.558	-2.092	-1.646
8	Aligarh	0.990	1.298	-0.257	1.378	0.938	1.583	0.687	0.101	0.839
9	Hathras	-0.134	-0.882	-0.584	-0.463	-1.145	-0.816	-1.277	-1.432	-0.841
10	Mathura	-0.083	0.553	-0.388	-0.494	-0.430	0.791	0.827	-0.138	0.079
11	Agra	0.173	0.287	0.333	0.098	0.173	0.748	0.126	0.246	0.273
12	Firozabad	-1.105	0.068	-0.846	0.364	-0.957	0.150	2.440	1.791	0.238
13	Mainpuri	-0.543	1.397	-1.174	1.605	-1.183	0.224	-0.295	-0.649	-0.277
14	Etah	0.377	0.764	-0.650	1.181	0.210	0.299	0.266	0.067	0.314
15	Bareilly	0.633	0.084	-0.126	0.384	0.737	-0.636	-0.506	1.298	0.233
16	Budaun	-0.696	0.507	0.661	-0.229	0.411	-1.290	-1.067	-0.361	-0.258
17	Shahjahanpur	0.173	1.349	-0.388	-0.045	0.085	-1.315	-0.926	-0.703	-0.221
18	Pilibhit	-1.821	0.483	-1.370	-0.130	-1.434	-0.947	-0.295	0.701	-0.601
19	Bijnor	-0.032	0.030	1.316	-0.546	-0.166	-0.262	-0.155	-0.836	-0.081
20	Moradabad	2.575	-0.691	1.643	-1.506	1.992	-0.636	0.056	1.296	0.591
21	Jyotibafule Nagar	1.399	-1.506	0.071	-1.750	0.122	-1.446	-1.277	-0.154	-0.567
22	Rampur	-0.952	-0.055	0.333	-0.628	-1.246	-0.897	-1.067	1.240	-0.409
23	Farrukhabad	-0.083	0.044	0.136	1.110	0.649	1.221	0.617	0.923	0.577
24	Etawah	-1.923	1.820	-0.781	2.604	0.147	1.358	0.406	0.383	0.501

Source: District Statistical Bulletin (www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2)

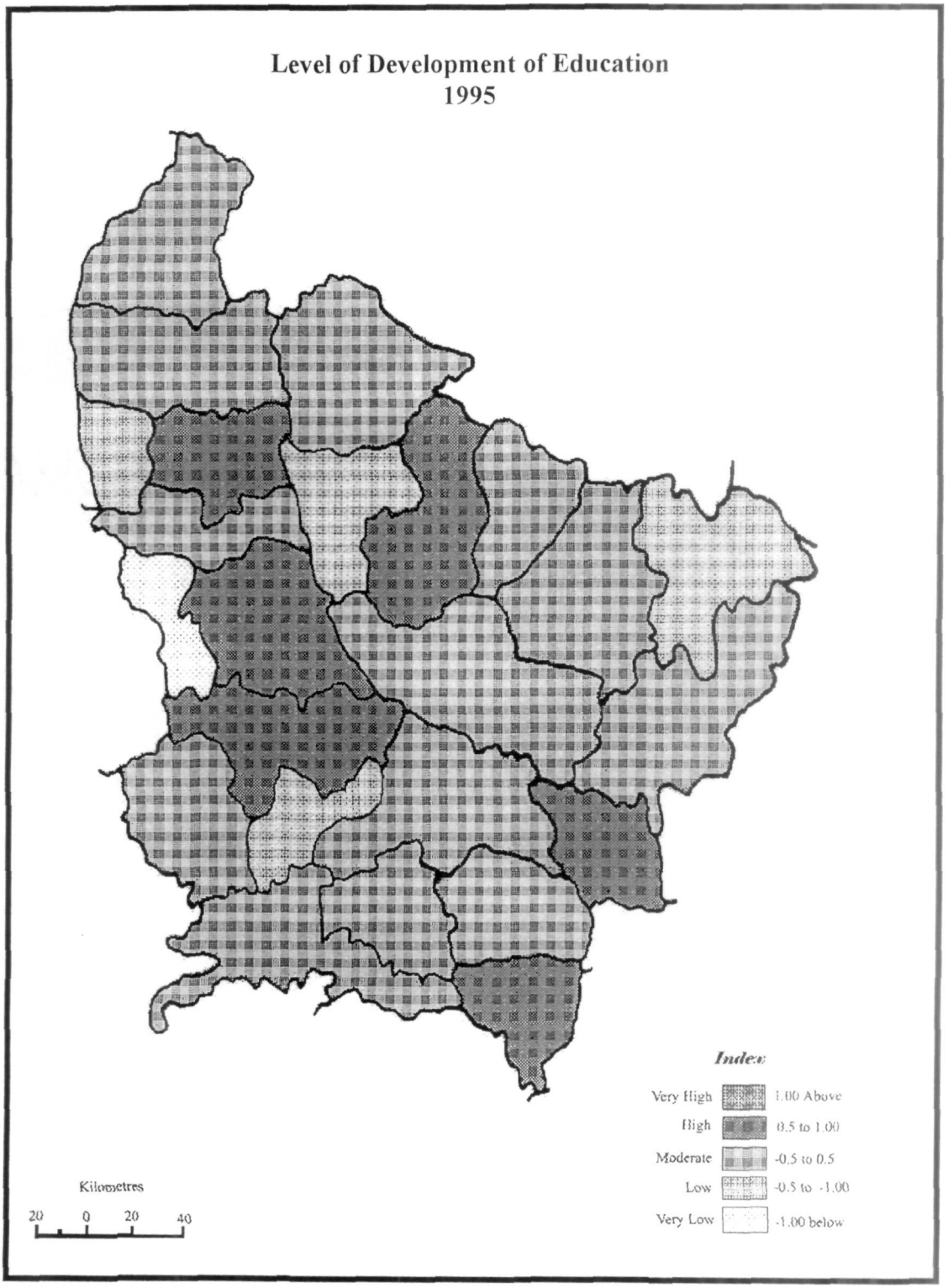
Level of Development of Education
1995
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

FIG. 4.1

Table 4.2: Level of Development of Education of Districts Ranked on the Basis of Composite Index for the Year 2005.

	Districts	EDUCATION								Composite Z-Score education
		No. of Schools/ Per lakh Population				Teacher pupil Ratio				
		Junior Basic School	Senior Basic School	Higher Secondary School	Degree College	Junior Basic School	Senior Basic School	Higher Secondary School	Degree College	
1	Saharanpur	0.374	-0.754	0.943	-0.703	0.752	-0.270	-0.492	-0.772	-0.115
2	Muzaffar Nagar	1.321	0.213	-0.735	0.128	1.562	-0.421	-0.099	-0.641	0.166
3	Meerut	0.764	-0.483	1.463	0.243	0.198	-0.145	-0.989	-0.897	0.019
4	Baghpat	-1.297	-0.583	-0.330	-0.725	-0.627	0.224	1.307	-1.436	-0.434
5	Bulandshahar	0.931	0.087	1.868	0.191	1.420	1.385	-0.394	-0.282	0.650
6	Ghaziabad	0.541	-0.598	-0.446	-0.551	0.041	-0.805	0.620	-0.976	-0.271
7	Gautam Budha Nagar	-2.022	-0.150	-1.314	0.085	-2.133	-0.047	3.957	1.978	0.044
8	Aligarh	0.318	-0.783	-0.446	-0.798	0.368	1.016	-0.328	1.974	0.165
9	Hathras	-0.907	0.654	-0.677	0.283	-1.252	0.778	0.032	-0.789	-0.236
10	Mathura	-0.128	-0.729	-0.967	-0.683	-0.413	0.537	-0.361	1.206	-0.192
11	Agra	0.652	-0.985	0.422	-1.183	0.937	1.012	-0.394	-0.329	0.016
12	Firozabad	-0.573	-0.849	-0.735	-0.548	-0.413	0.171	-0.754	1.218	-0.310
13	Mainpuri	-0.239	1.654	-0.909	1.381	-0.598	0.699	-0.361	-1.094	0.066
14	Etah	0.708	0.960	-0.446	1.326	0.980	1.506	0.457	0.261	0.719
15	Bareilly	0.931	0.141	-0.099	-0.026	1.363	-1.510	-0.688	0.535	0.080
16	Budaun	1.209	-0.458	2.389	-0.482	0.838	-1.141	-0.296	1.254	0.414
17	Shahjahanpur	0.095	0.896	-0.099	-0.263	0.653	-0.771	-0.296	0.315	0.066
18	Pilibhit	-1.186	0.269	-1.025	0.359	-0.726	-0.824	-0.590	0.975	-0.343
19	Bijnor	0.652	0.250	1.290	-0.163	0.553	-0.236	-0.557	-0.623	0.145
20	Moradabad	1.599	-2.918	0.885	-2.379	0.923	-2.724	-1.178	0.448	-0.668
21	Jyotibafule Nagar	-0.295	0.416	-1.082	-0.025	-1.323	1.099	-0.132	-1.186	-0.316
22	Rampur	-0.406	0.910	0.885	0.375	-1.153	-0.922	0.391	0.433	0.064
23	Farrukhabad	-0.907	0.793	-0.562	1.332	-0.755	0.586	0.424	-0.893	0.002
24	Etawah	-2.133	2.047	-0.272	2.824	-1.195	0.804	0.719	-0.681	0.264

Source: District Statistical Bulletin (www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2)

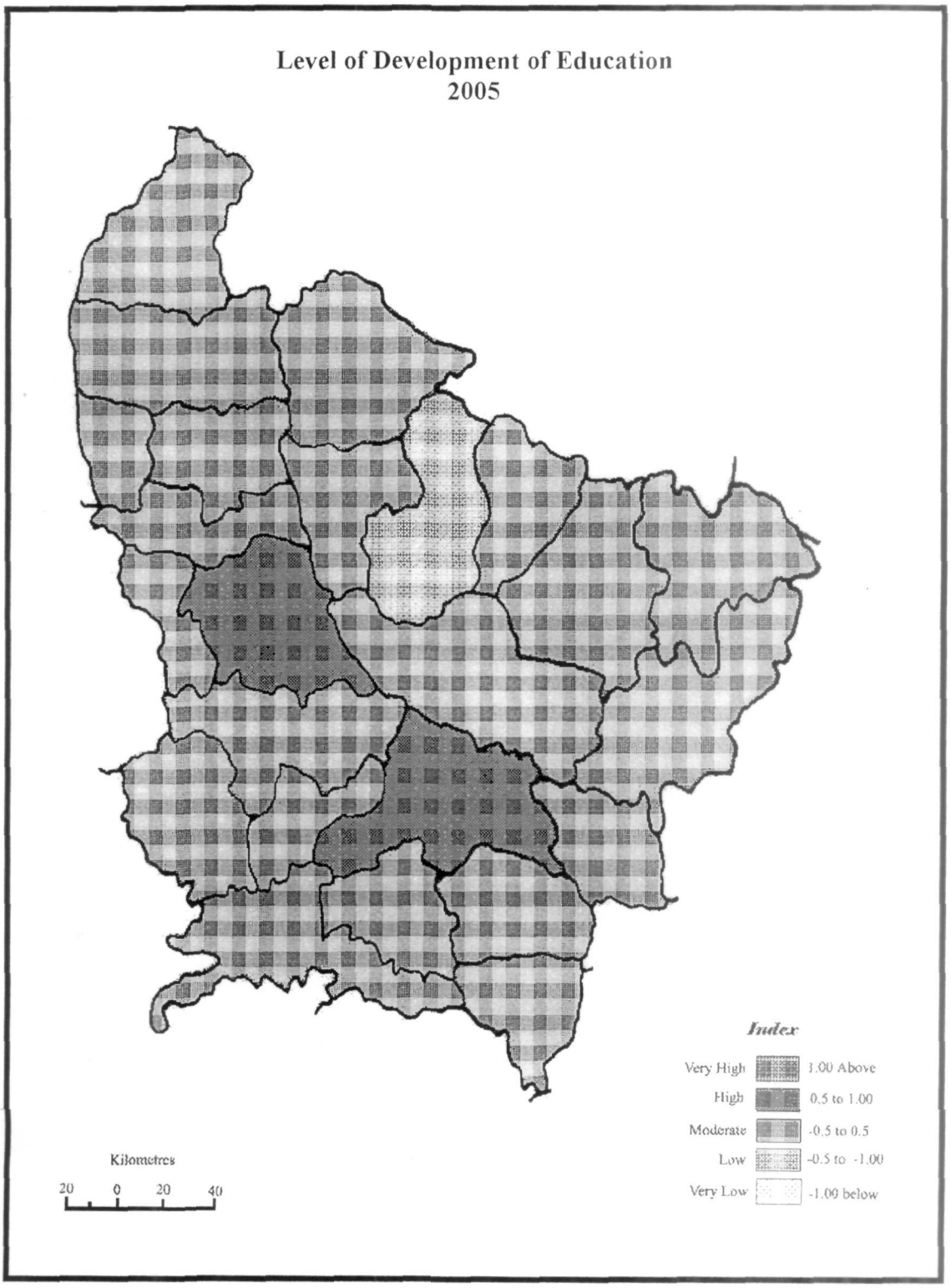
Level of Development of Education
2005
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

FIG. 4.2

Extensively, for a detailed knowledge, all fifteen social indicators have been divided into sub-units, for instance, education, electricity availability, health centre facilities have been categorized into separate divisions for a micro level study and after that z-score of all social indicators have been find out for proper macro level study. The categorization is same for economic indicators too. A composite index of each district has been marked out on the basis of z-score of variables calculated.

Study reveals that there is a low or little progress in the field of education in western Uttar Pradesh (Table 4.1 & Fig. 4.1) and the level of educational development varies from region to region. The district of Etawah, Aligarh and Bulandshahr have large number of basic schools. In the districts of Bulandshahr, Firozabad, Bareilly and Shahjahanpur, the teacher pupil ratio is fairly up to the level of satisfaction.

Data composite z-score for the year 1995 shows negligible or little progress in education as a whole in half districts of Western Uttar Pradesh. Districts Meerut, Aligarh, Bulandshahr, Moradabad, Farrukhabad, Etawah, Etah, Agra, Firozabd, Barielly, Saharnpur, Mathura, Comparatively categorized under high level of development in education.

Composite z-score of education for the year 2005 reflects a further development, although not speedy, in the field of education as a whole (Table 4.2 & Fig. 4.2). Notably, Budaun, Muzaffarnagar, Gautam Budha Nagar and Mainpuri have recorded their names in the list of progressively showing good performance in the over all educational advancement. The districts having highest level of education are Etah, Aligarh, Bulandshahr, Etawah, Shahjahanpur. Education and quality literacy is the need of the hour. Literacy rate is higher in urban areas than in rural areas. Women are less likely to be literate than men. Within the household, women are significantly more disadvantaged than men. Besides poor literacy rates they have less control over decision making within the family and over family assets. Government initiates

Table 4.3: District wise level of development of Roadways for 1995.

		ROADWAYS	Composite Z-Score roadways
	Districts	Total length of roads (Km)	
1	Saharanpur	1.043	1.043
2	Muzaffar Nagar	-0.877	-0.877
3	Meerut	-0.338	-0.338
4	Baghpat	-0.953	-0.953
5	Bulandshahar	2.420	2.420
6	Ghaziabad	-0.439	-0.439
7	Gautam Budha Nagar	-0.952	-0.952
8	Aligarh	-0.482	-0.482
9	Hathras	-0.934	-0.934
10	Mathura	1.438	1.438
11	Agra	-0.278	-0.278
12	Firozabad	0.033	0.033
13	Mainpuri	-0.604	-0.604
14	Etah	-0.378	-0.378
15	Bareilly	-0.459	-0.459
16	Budaun	-0.464	-0.464
17	Shahjahanpur	-1.153	-1.153
18	Pilibhit	-0.474	-0.474
19	Bijnor	2.836	2.836
20	Moradabad	0.526	0.526
21	Jyotibafule Nagar	0.021	0.021
22	Rampur	0.280	0.280
23	Farrukhabad	0.182	0.182
24	Etawah	0.006	0.006

Source: District Statistical Bulletin
(www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2)

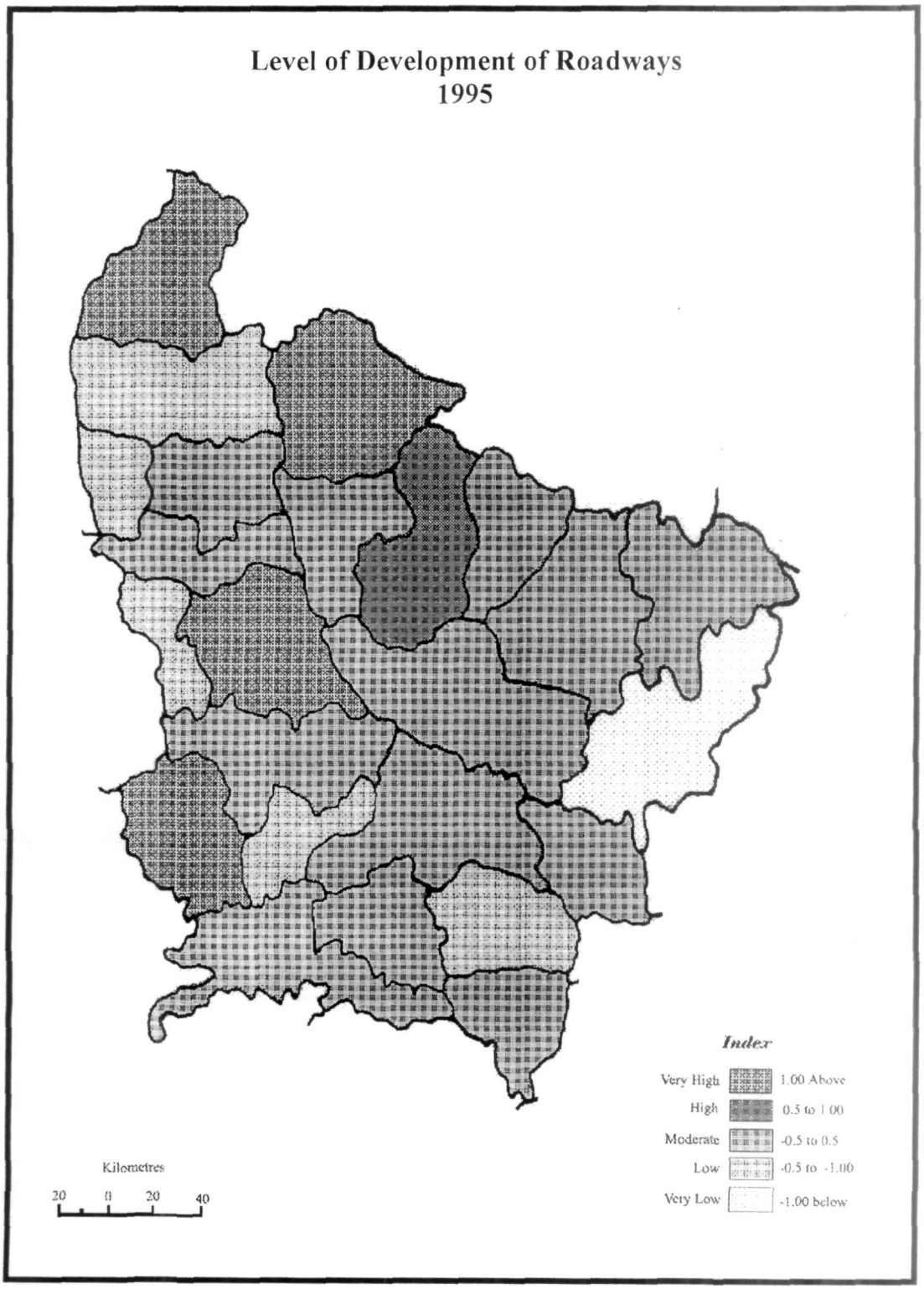
Level of Development of Roadways
1995
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20
0
20
40

FIG. 4.3

Table 4.4: District Wise Level of Development of Roadways for 2005.

		ROADWAYS	Composite Z-Score roadways
	Districts	Total length of roads (Km)	
1	Saharanpur	-1.088	-1.088
2	Muzaffar Nagar	-0.774	-0.774
3	Meerut	-0.492	-0.492
4	Baghpat	1.236	1.236
5	Bulandshahar	1.772	1.772
6	Ghaziabad	-1.004	-1.004
7	Gautam Budha Nagar	2.948	2.948
8	Aligarh	1.266	1.266
9	Hathras	0.138	0.138
10	Mathura	-0.036	-0.036
11	Agra	-0.239	-0.239
12	Firozabad	1.282	1.282
13	Mainpuri	-1.177	-1.177
14	Etah	-0.449	-0.449
15	Bareilly	-0.238	-0.238
16	Budaun	0.102	0.102
17	Shahjahanpur	-0.129	-0.129
18	Pilibhit	0.149	0.149
19	Bijnor	-0.149	-0.149
20	Moradabad	-0.582	-0.582
21	Jyotibafule Nagar	0.030	0.030
22	Rampur	-0.893	-0.893
23	Farrukhabad	-0.717	-0.717
24	Etawah	-0.957	-0.957

Source: District Statistical Bulletin
(www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2)

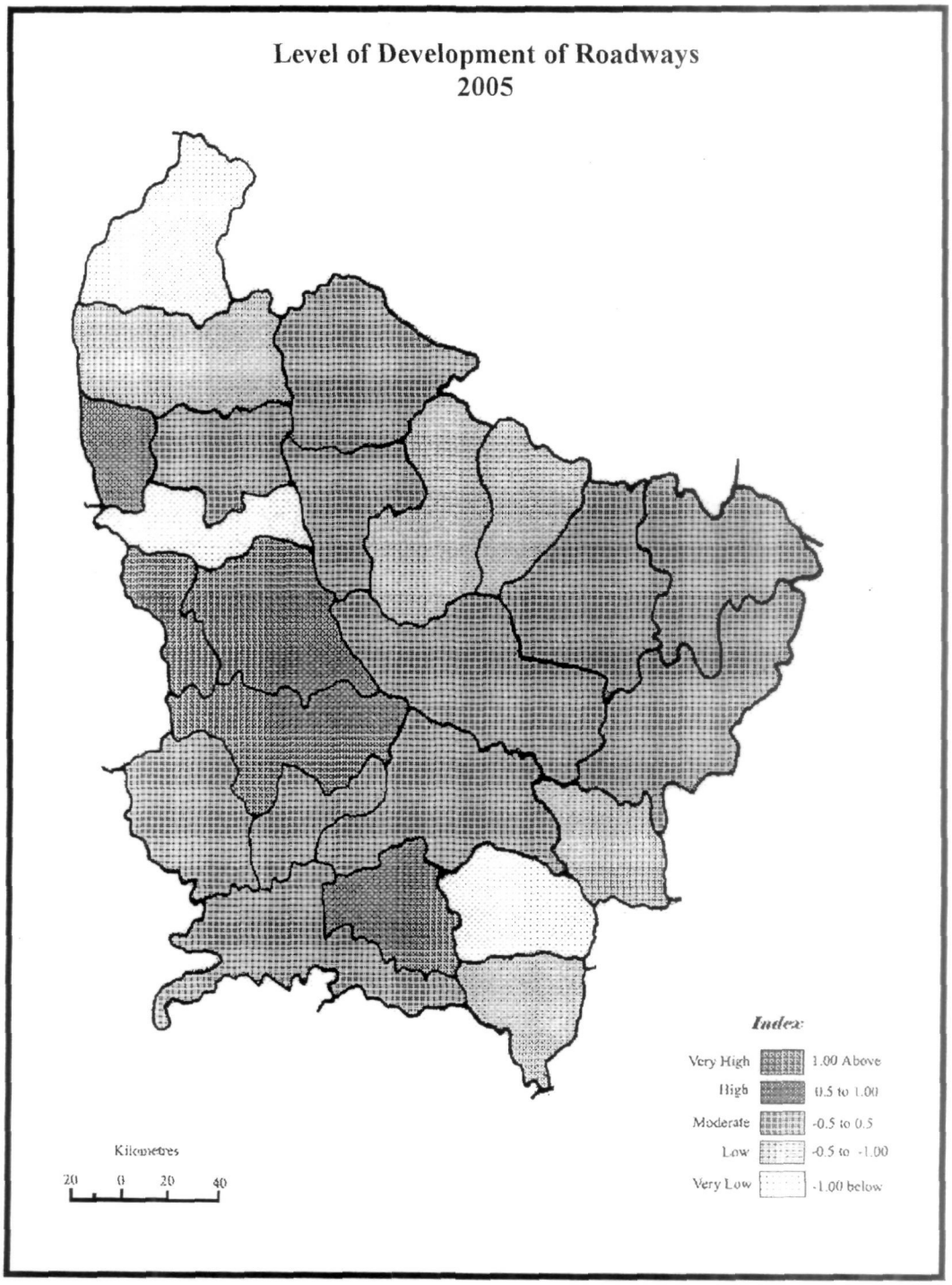
Level of Development of Roadways
2005
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

FIG. 4.4

through various programmes to improve the level of education is a positive sign. Certain NGOS across the nation have also doing tremendous endeavours in improving percentage number of educated and institutions. In combination, these efforts have good outcome. Even, there have been achievements in education sector, increase in literacy and enrolment rates but it has not been up to the level of satisfactory.

Infrastructure such as roadways will have beneficial effects to a wide spectrum of urban as well as rural activities. Many villages connecting to main roads and link roads is innovative techniques of grass root level development by the people for the people of the people. Highest concentration of roads in length km has been located in Meerut, Bulandshahr, Bijnor, Mathura, Agra, Moradabad (Table 4.3 & Fig. 4.3). Baghpat, Gautam Budha Nagar, Hathras, Etah, Mainpuri have the shortage length of roadways in total length of road.

Composite z-score of roadways for 2005 shows remarkably good network of metallic roads in western Uttar Pradesh (Table 4.4 & Fig. 4.4). However all the villages are not connected with the metallic roads. Villages not having metallic roads are not connected with the public transport system. The percentage of surfaced roads increased in recent times. At the same time there is a dramatic increase in the proportion of surfaced and unsurfaced roads. Roads in rural areas clearly play a tremendous role in poverty reduction as they provide access not only to schools and health centers but to markets. In Uttar Pradesh the levels of urbanization is high in the west, at over 26.3 percent within western Uttar Pradesh, urbanization rates range from a high of just over 46 percent in the district of Ghaziabad to a low of about 13 percent in Mainpuri district. Study reveals that investment in rural roads has the most potent effect on poverty alleviation.

The western Uttar Pradesh continues to have more developed infranstructure in terms of electricity. The large number of inhabited total electrified villages is located in Muzaffarnagar, Ghaziabad, Saharanpur,

Table 4.5 : Level of Development of Electricity of Districts Ranked on the Basis of Composite Index for the Year 1995.

		ELECTRICITY			Composite Z-Score Electricity
	Districts	% of electrified Villages in total Inhabited Villages	% of electricity consumption in agricultural division	Per head electricity consumption (kw/hrs)	
1	Saharanpur	0.463	-0.054	0.201	2.034
2	Muzaffar Nagar	2.324	0.843	0.382	1.183
3	Meerut	-1.102	0.031	3.360	0.763
4	Baghpat	1.438	-1.607	1.287	-0.586
5	Bulandshahar	1.902	1.893	0.225	1.340
6	Ghaziabad	0.126	0.345	1.382	6.177
7	Gautam Budha Nagar	-0.707	-0.957	-0.781	-0.815
8	Aligarh	-0.605	-0.462	0.317	-0.250
9	Hathras	-1.430	-1.620	-1.910	-1.654
10	Mathura	-0.520	-1.450	-0.035	-6.684
11	Agra	0.028	-0.704	0.576	-3.333
12	Firozabad	1.098	1.708	-0.764	6.709
13	Mainpuri	0.553	-0.126	-0.548	-4.033
14	Etah	-1.185	-1.037	-0.078	-7.666
15	Bareilly	1.230	1.277	0.057	8.547
16	Budaun	-0.177	0.036	-0.605	-2.727
17	Shahjahanpur	-0.143	1.119	-0.688	0.096
18	Pilibhit	0.356	0.811	-0.771	0.132
19	Bijnor	0.735	-0.315	0.500	3.067
20	Moradabad	-0.739	0.736	0.290	9.567
21	Jyotibafule Nagar	-1.442	-0.176	-0.276	-8.277
22	Rampur	-0.126	-1.176	-0.682	-6.614
23	Farrukhabad	0.701	0.997	-0.413	4.284
24	Etawah	0.098	0.059	-0.405	-8.267

Source: District Statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

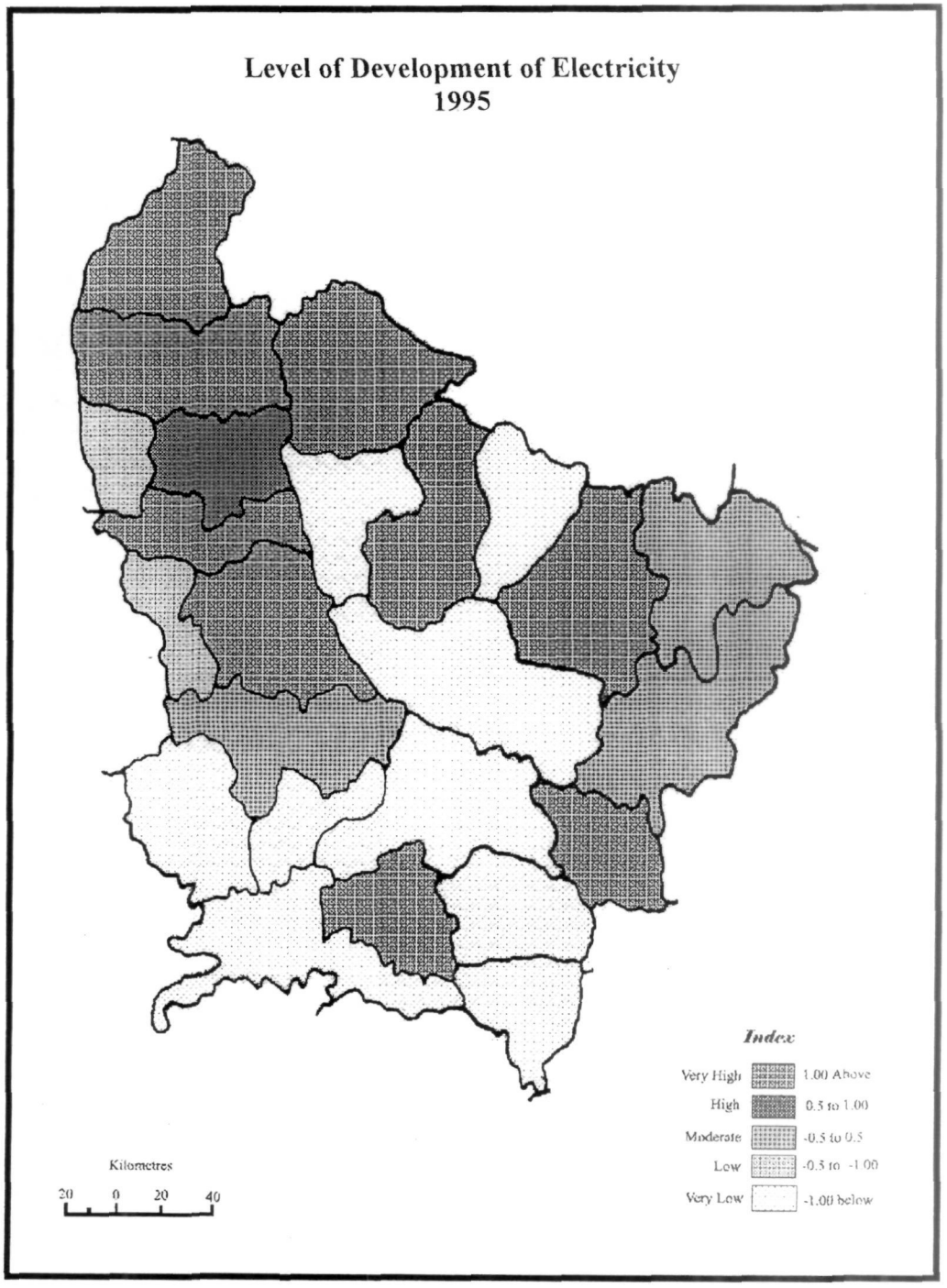
Level of Development of Electricity
1995
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20
0
20
40

FIG. 4.5

Table 4.6: Level of Development of Electricity of Districts Ranked on the Basis of Composite Index for the year 2005.

		ELECTRICITY			Composite Z-Score Electricity
	Districts	**% of electrified Villages in total Inhabited Villages**	**% of electricity consumption in agricultural division**	**Per head electricity consumption (kw/hrs)**	
1	Saharanpur	2.776	-0.173	0.723	1.108
2	Muzaffar Nagar	-0.587	-0.782	1.483	0.038
3	Meerut	-1.183	-0.614	0.629	-4.226
4	Baghpat	-1.024	-0.405	-1.477	-9.686
5	Bulandshahar	-1.278	-0.865	0.536	-5.356
6	Ghaziabad	-0.684	-0.386	1.431	1.204
7	Gautam Budha Nagar	2.090	-0.734	-0.971	1.284
8	Aligarh	-0.965	2.091	0.408	5.113
9	Hathras	1.250	0.331	-1.186	1.317
10	Mathura	-0.026	-0.733	-0.346	-3.684
11	Agra	-0.274	-0.652	1.583	0.219
12	Firozabad	-0.586	-0.549	-0.776	-0.637
13	Mainpuri	-0.383	-0.569	-0.468	-4.734
14	Etah	0.223	-0.757	0.266	-2.870
15	Bareilly	0.475	0.144	1.858	8.257
16	Budaun	-0.844	-0.640	-0.083	-5.224
17	Shahjahanpur	0.582	-0.367	-0.561	-1.154
18	Pilibhit	0.076	1.547	-0.711	0.304
19	Bijnor	-0.489	-0.281	0.679	-3.034
20	Moradabad	-0.277	-0.250	1.048	1.737
21	Jyotibafule Nagar	1.460	0.398	-1.110	2.494
22	Rampur	-0.320	3.217	-0.762	7.117
23	Farrukhabad	-0.220	-0.290	-1.468	-6.594
24	Etawah	0.209	1.136	-0.725	2.067

Source: District Statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

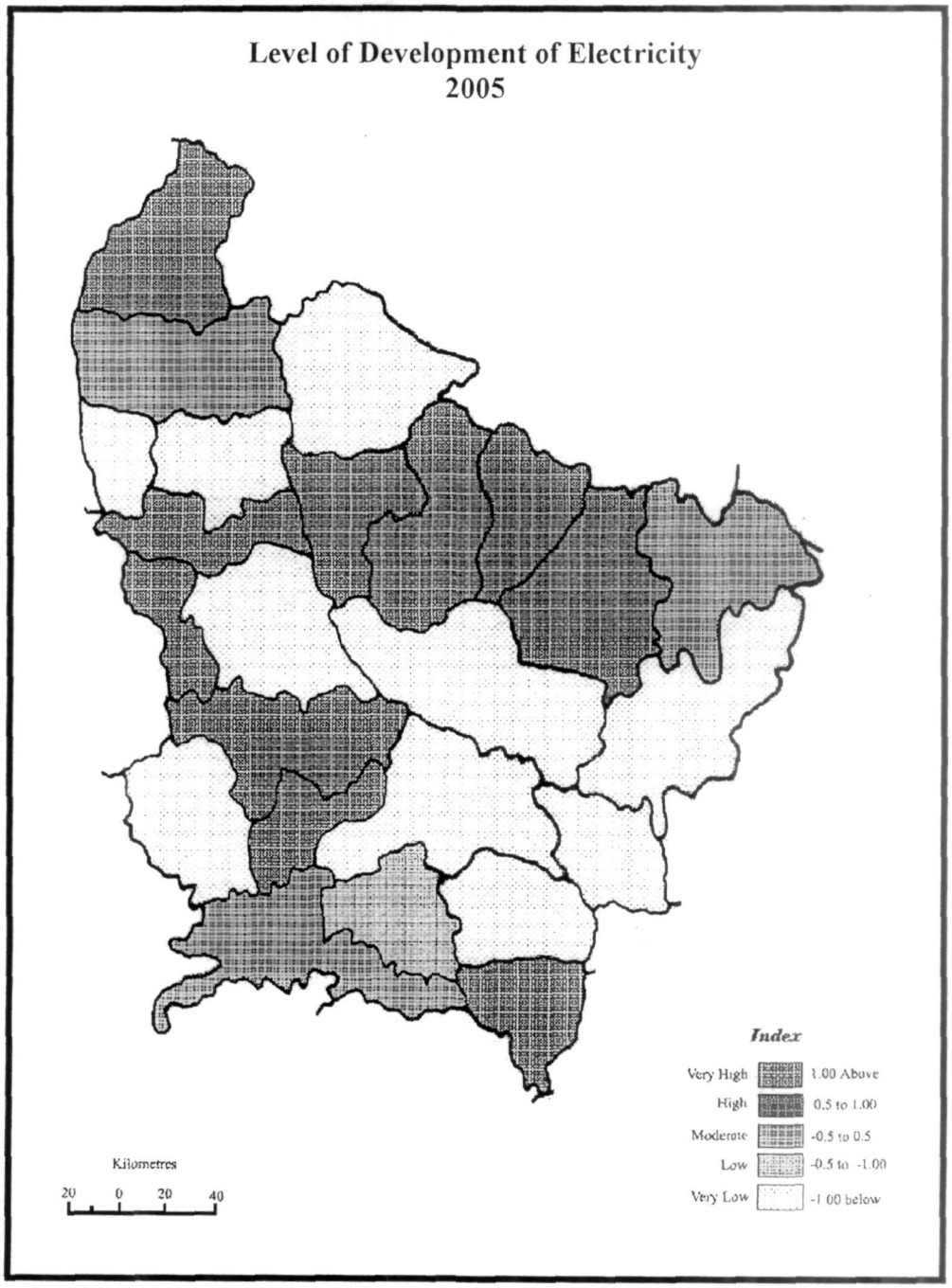
Level of Development of Electricity
2005
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

Fig. 4.6

Moradabad, Firozabad, Meerut (Table 4.5 & Fig. 4.5). The districts Mainpuri, Firozabad, Etah including above mentioned districts fairly comprise under heavy consumption of electricity in agricultural sector also. Per head electricity consumption (in kilowatt hrs) is moderately high in most of the districts except a few one. Regions either in the process of urbanization or looking for commercial activities of various manifestations are evolving through infrastructural facilities. In 2005 as shown in Table 4.6 fig. 4.6, the number of electrified villages and consumption of electricity in agricultural sectors in total electricity consumption have upward moving trend. But this much generating electricity and available resources seems to be insufficient as the demand of electricity is growing day by day in house holds and agricultural and industrial sectors. This power sector is very crucial for over all development. The dilemma remains, villages were electrified; however, they also do not get proper supply. On this front, the rapid development of industrial and infrastructural sectors have been observed and the shifting of agro-processing activities from rural sector to bigger towns have been taking momentum due to better availability of electricity and other facilities.

Uttar Pradesh as a whole has the highest maternal mortality ratio (MMR), the highest fertility rate, the second highest infant mortality rate (IMR) and one of the lowest-female to male ratio. Knowledge empowerment on a variety of issues including health is an important need of discussion. Primary health centres in good proportion are found in Meerut, Aligarh, Etah, Saharanpur, Moradabad, Muzaffarnagar districts. These districts also registered high presence of family and mother child welfare centre (Table 4.7 & Fig. 4.7). Hathras, Etah, Gautam Budha Nagar, Shahjahanpur, Pilibhit, Bijnor have shown poorly availability of health facilities.

Districts ranked on the basis of composite index of health centres for 2005 have, remarkably, recorded a better improvement. Hathras, Bijnor, Gautam Budha Nagar, Budaun dramatically improved their ratings. Now, they categorized under high level of development (Table 4.8 & Fig. 4.8). The region

Table 4.7: Level of Development of Health Facilities of Districts Ranked on the Basis of Composite Index for the Year 1995.

		Health centers			Composite Z-Score Health facilities
	Districts	**Primary health centres**	**Family & mother child Welfare centre**	**Family & mother child welfare sub- centre**	
1	Saharanpur	0.831	-0.202	0.467	3.654
2	Muzaffar Nagar	1.064	0.359	1.208	0.877
3	Meerut	1.210	0.759	0.777	9.154
4	Baghpat	-3.038	-0.583	-0.071	-1.230
5	Bulandshahar	1.120	1.087	-1.495	2.374
6	Ghaziabad	0.847	-1.130	3.513	1.077
7	Gautam Budha Nagar	-0.869	-1.568	0.663	-5.914
8	Aligarh	1.113	-0.517	0.822	4.727
9	Hathras	-1.102	-1.136	-0.224	-8.207
10	Mathura	1.191	0.837	0.749	3.677
11	Agra	0.104	-0.896	0.623	-5.674
12	Firozabad	0.809	1.468	-0.128	7.164
13	Mainpuri	0.064	2.151	-0.754	0.487
14	Etah	-0.302	1.320	-0.999	6.333
15	Bareilly	-0.194	-1.534	-0.085	-0.475
16	Budaun	-0.033	0.285	-0.562	-1.033
17	Shahjahanpur	-1.401	0.323	-0.832	-6.337
18	Pilibhit	-0.907	-0.248	-0.547	-5.674
19	Bijnor	0.079	-1.322	-0.253	-4.987
20	Moradabad	0.675	0.367	-0.044	3.327
21	Jyotibafule Nagar	-0.511	0.009	-0.728	-0.410
22	Rampur	-0.212	-0.036	-0.511	-0.253
23	Farrukhabad	0.173	0.665	-0.849	-3.666
24	Etawah	-0.173	1.218	-0.751	-0.082

Source: District Statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

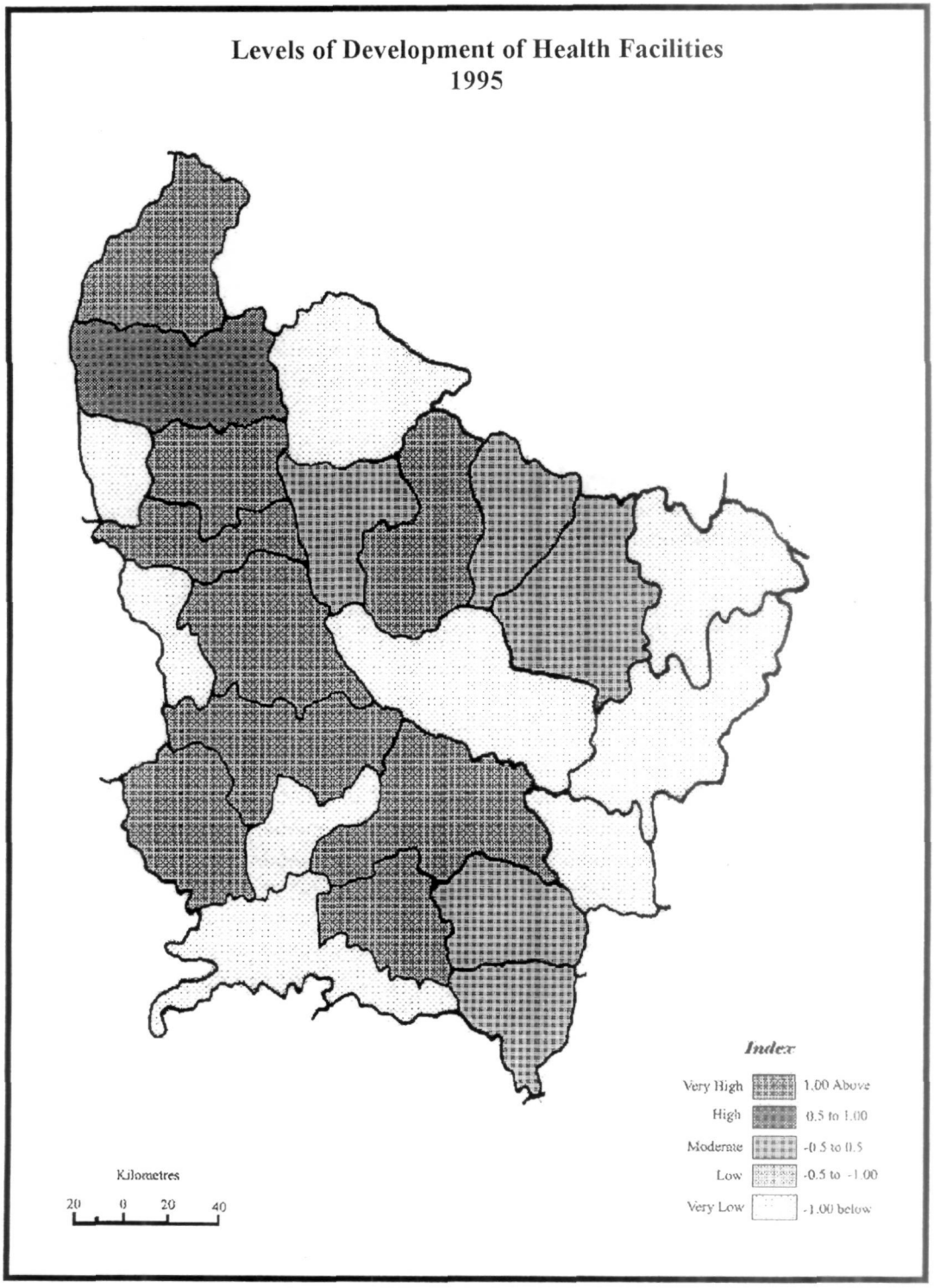
Levels of Development of Health Facilities
1995
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20
0
20
40

FIG. 4.7

Table 4.8 Level of Development of Health facilities of Districts Ranked on the Basis of Composite Index for the year 2005.

		Health centers			Composite Z-Score Health facilities
	Districts	**Primary health centres**	**Family & mother child Welfare centre**	**Family & mother child welfare sub- centre**	
1	Saharanpur	1.206	-0.179	0.047	0.358
2	Muzaffar Nagar	1.205	-0.309	0.411	4.357
3	Meerut	1.273	-0.826	0.270	0.239
4	Baghpat	1.210	1.668	0.063	9.804
5	Bulandshahar	-0.100	0.786	-0.188	0.166
6	Ghaziabad	1.047	-1.515	1.536	0.356
7	Gautam Budha Nagar	0.813	-0.561	4.090	1.447
8	Aligarh	-0.417	-0.218	-0.095	-2434
9	Hathras	1.210	0.873	-0.295	0.596
10	Mathura	0.989	-1.377	0.285	-0.101
11	Agra	0.380	-1.353	0.728	-8.167
12	Firozabad	-1.023	-0.402	0.206	-5.437
13	Mainpuri	-0.667	1.283	-0.694	-0.026
14	Etah	-1.523	1.204	-0.655	-3.247
15	Bareilly	-0.305	-1.417	-0.394	-7.054
16	Budaun	1.210	1.687	-0.595	7.791
17	Shahjahanpur	-0.459	-0.156	-0.591	-0.402
18	Pilibhit	-1.302	-0.087	-0.707	-6.987
19	Bijnor	0.192	0.708	-0.178	2.407
20	Moradabad	-0.183	-0.621	-0.934	-5.794
21	Jyotibafule Nagar	-1.628	1.618	-0.229	-7.967
22	Rampur	-1.223	-0.728	-0.447	-7.994
23	Farrukhabad	-1.243	0.440	-0.551	-4.514
24	Etawah	-0.662	-0.519	-0.473	-5.514

Source: District Statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

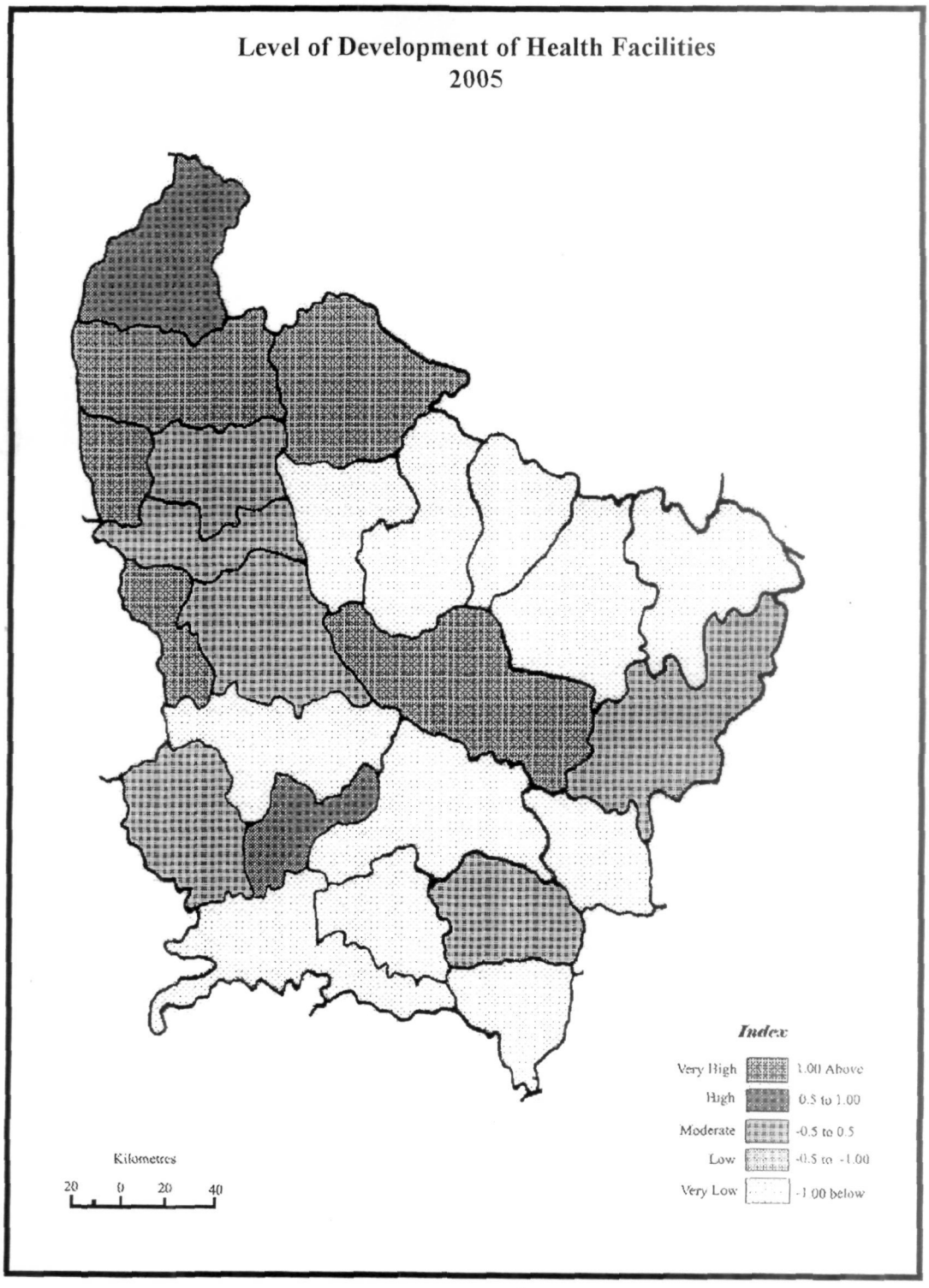
Level of Development of Health Facilities
2005
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

FIG. 4.8

as a whole is not improving well on front of medical facilities. Still thousands and thousands poorers and landless labourers have no proper access to medical facilities. The huge cost of private medical centres debarred them to better health facilities. In certain cases, there is no government medical centres and if the health provision is made available, these centres lacking better management and care facilities.

By an estimate 60 percent of the region's work force is still employed in agriculture of which 80 percent of farmers are small and marginal and 75 percent of the poor reside in rural areas. Sluggish farm sector growth and the sharp slow down in rural employment are the constraint to sustaining over all economic growth, and to achieving rural, urban and regional balance in economic gains.

Districts ranking lowest or even below average on the basis of composite index of income for the year 1995 are Jytibafule Nagar, Etawah, Mainpuri, Pilibhit, Etah, Shahjahanpur, Farrukhabad, Mathura, Bijnor, Baghpat (Table 4.9 & Fig. 4.9). Aligarh, Saharanpur, Ghaziabad, Meerut, Agra and Firozabad have shown good amount of share of money in national income and deposited money per person.

Now the trend of income again get boost up and the level of development up to 2005 strengthened further. In this enroute departure some districts improved their position and others minimize their low level ranking (Table 4.10 & Fig. 4.10). Pilibhit, Farrukhabad, Etah, Mainpuri, insipite of showing a further improvement, still categorized under low income groups.

The districts endowed with resources, better infrastructure and governance have tended to register, strong growth. The out reach of credit institutions, whether commercial banks or cooperative institutions are very low. It may be noted that the agricultural credit either by cooperative banks, or commercial banks and other agencies have been increased.

Table 4.9: Level of Development of Income of Districts Ranked on the basis of Composite Index for the year 1995

	Districts	Income			Composite Z-Score income
		Deposit in National income (in lakh)	Deposited money/ person	Actual Expenditure	
1	Saharanpur	0.523	0.410	-0.419	1.713
2	Muzaffar Nagar	0.084	0.263	-0.419	0.176
3	Meerut	2.603	1.628	-0.419	1.270
4	Baghpat	-0.568	0.057	-0.420	-3.176
5	Bulandshahar	-0.028	-0.066	-0.419	-0.171
6	Ghaziabad	1.523	-2.817	-0.419	1.307
7	Gautam Budha Nagar	-0.033	0.810	-0.420	0.119
8	Aligarh	1.384	0.633	3.148	1.722
9	Hathras	-0.038	-0.856	-0.420	-0.438
10	Mathura	-1.493	0.599	-0.419	-4.377
11	Agra	1.731	-.723	-0.419	1.011
12	Firozabad	-0.278	-0.177	1.376	0.307
13	Mainpuri	-0.893	-0.738	-0.419	-6.840
14	Etah	-0.682	-0.706	-0.419	-6.020
15	Bareilly	-0.095	0.274	-0.419	-0.080
16	Budaun	-0.994	-0.894	2.713	0.275
17	Shahjahanpur	-0.758	-0.505	-0.419	-5.607
18	Pilibhit	-1.036	-0.457	-0.419	-6.374
19	Bijnor	-0.603	-0.207	-0.419	-4.097
20	Moradabad	0.549	-1.498	-0.419	-0.466
21	Jyotibafule Nagar	-0.557	-1.602	-0.420	-8.597
22	Rampur	-1.188	-0.505	1.148	-1.817
23	Farrukhabad	-0.262	-0.634	-0.419	-4.384
24	Etawah	0.536	-0.368	-0.419	-8.370

Source: District Statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

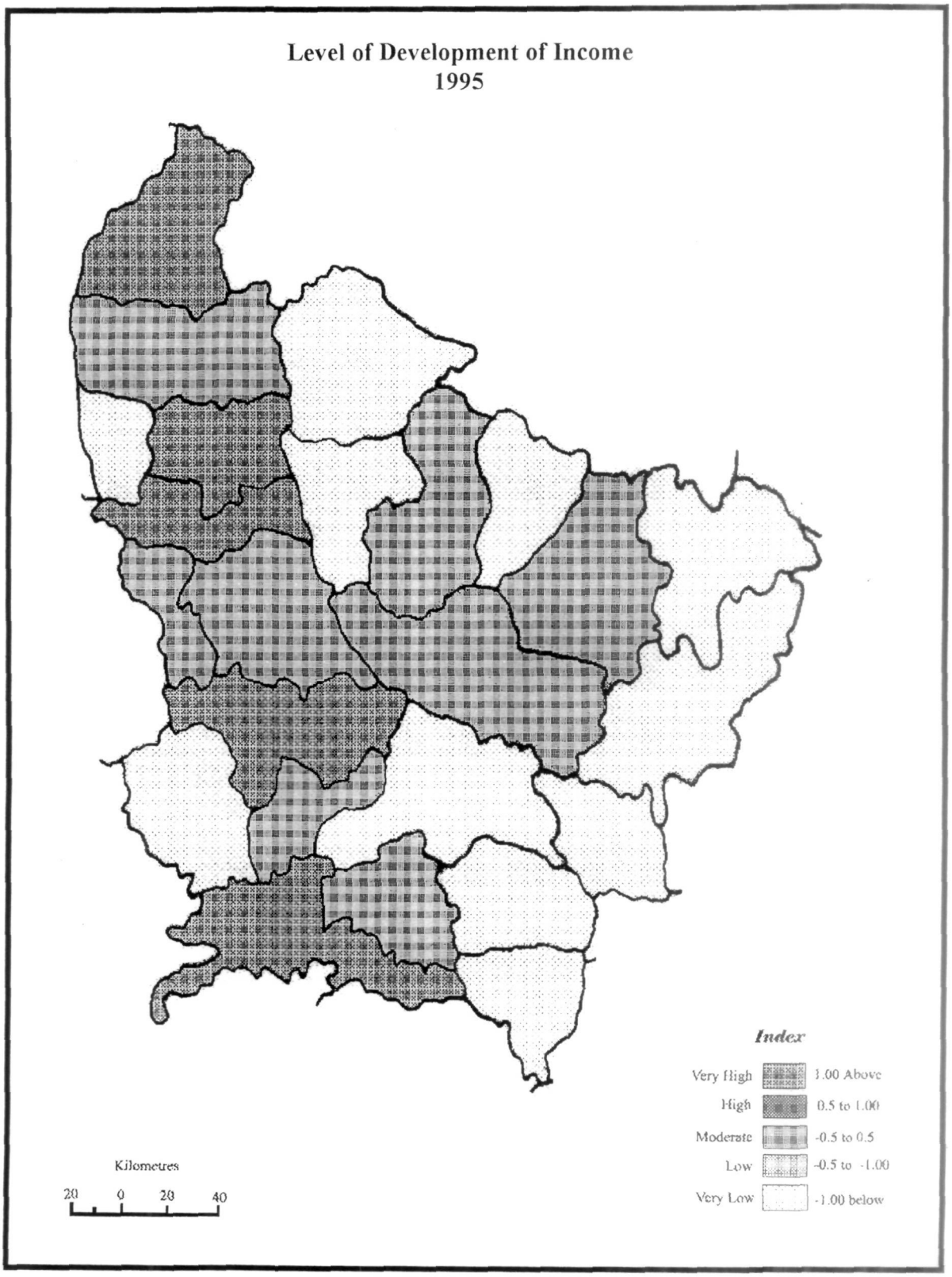
Level of Development of Income
1995
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

FIG. 4.9

Table 4.10 : Level of Development of Income of Districts Ranked on the Basis of Composite index for the year 2005

	Districts	Income			Composite Z-Score income
		Deposit in National income (in lakh)	Deposited money/ person	Actual Expenditure	
1	Saharanpur	-0.225	0.000	-0.426	-0.217
2	Muzaffar Nagar	-0.210	-0.185	-0.426	-2.737
3	Meerut	-0.167	0.659	-0.426	0.022
4	Baghpat	-0.268	-0.289	-0.426	-3.277
5	Bulandshahar	-0.198	-0.113	-0.426	-1.137
6	Ghaziabad	-0.006	1.446	-0.427	3.377
7	Gautam Budha Nagar	-0.184	3.957	-0.427	1.115
8	Aligarh	-0.211	0.551	3.200	1.180
9	Hathras	-0.270	-0.280	-0.408	-3.194
10	Mathura	-0.268	-0.048	-0.426	-2.154
11	Agra	-0.164	0.921	-0.426	1.104
12	Firozabad	-0.249	-0.329	1.741	3.877
13	Mainpuri	-0.271	-0.405	-0.426	-3.674
14	Etah	-0.257	-0.507	-0.426	-3.970
15	Bareilly	-0.200	-0.076	-0.425	-2.307
16	Budaun	-0.264	-0.636	-0.426	-0.442
17	Shahjahanpur	-0.262	-0.941	-0.426	-0.543
18	Pilibhit	-0.268	-0.456	-0.426	-3.840
19	Bijnor	-0.242	-0.348	-0.427	-0.339
20	Moradabad	4.771	-0.939	-0.427	1.135
21	Jyotibafule Nagar	-0.207	-0.514	1.168	0.149
22	Rampur	-0.265	-0.500	-0.426	-0.397
23	Farrukhabad	-0.262	-0.943	-0.426	-5.437
24	Etawah	-0.251	-0.120	2.397	6.754

Source: District Statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

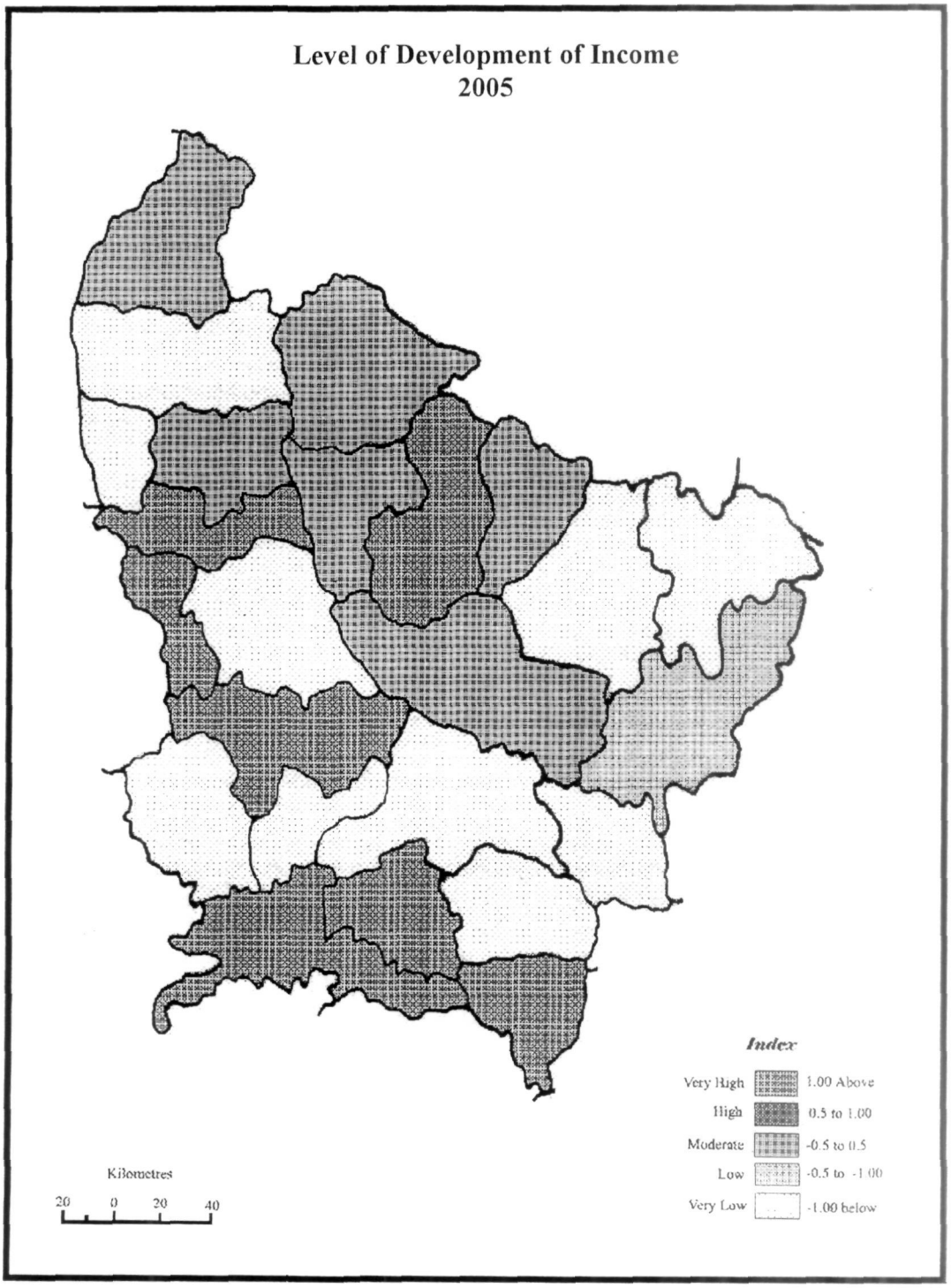
Level of Development of Income
2005
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20
0
20
40

FIG. 4.10

In numbers, the nationalized and other banks have well strength in Meerut, Gautam Budha Nagar, Ghaziabad, Baghpat, Shahjahanpur, Muzaffar Nagar (Table 4.11 & Fig. 4.11). Mainpuri, Firozabad, Etah and Farrukhabad, categorized under less number of banking facilities. The credit deposit ratio and number of scheduled commercial banks varies inter regionally. Even in a long period of ten years, the situation as per composite z-score 2005, (Table 4.12 & Fig. 4.12), was remain stagnant. District neither showing better improvement in corporate sector nor showing better credit facilities. This sector and its presence seems to be an ideal bond for many commercial activities. This is an essential commodity for farm and non-farm sectors. The urban as well as rural house holds both farm and non-farm respond to the provision capital availability and these responses are in the form of investment looking for better economic opportunities.

Information technology of any form plays an important role in all walks of human life. India is committed to its mission for IT-revolution. Thus, the largest part of the nation has accessibility to communication facilities. Agra, Gautam Budha Nagar, Meerut, Baghpat, Muzaffarnagar, Saharanpur have large number of telephones per lakh population (Table 4.13 & Fig. 4.13). Moradabad, Ghaziabad, Hathras Shahjahanpur, Farrukhabad, Etah lie under medium category. Jytibafule Nagar, Mainpuri, Pilibhit, Etawah poorly categorized at bottom level.

As the traditional agriculture is transforming into hi-tech agriculture, the need for updated information is also essential for agricultural production and productivity, eventually giving a lucrative yield and income to the farming community.

In real terms, the telephones facilities increasing graphically per lakh population as it is evident from the data 2005, but composite z-score of communication is showing negligible increase or least addition because at the same time the growth rate of population moving alarmingly (Table 4.14 & Fig.

Table 4.11: Level of Development of Credit Facilities of Districts Ranked on the Basis of Composite Index for the Year 1995

	Districts	Credit facilities		Composite Z-Score Credit Facilities
		Nationalized Bank Branches	Other	
1	Saharanpur	0.837	-0.675	0.081
2	Muzaffar Nagar	0.936	-0.386	0.275
3	Meerut	2.509	0.265	1.387
4	Baghpat	0.169	1.422	0.795
5	Bulandshahar	0.837	-0.603	0.117
6	Ghaziabad	2.037	-0.169	0.934
7	Gautam Budha Nagar	0.070	2.869	1.469
8	Aligarh	0.208	-0.386	-0.089
9	Hathras	-0.519	0.699	0.090
10	Mathura	0.660	-0.386	0.137
11	Agra	1.191	-0.386	0.402
12	Firozabad	-0.913	-0.675	-0.794
13	Mainpuri	-1.345	-0.675	-1.010
14	Etah	-0.873	-0.603	-0.738
15	Bareilly	-0.306	-0.530	-0.918
16	Budaun	-0.657	0.121	-0.268
17	Shahjahanpur	-0.303	1.133	0.415
18	Pilibhit	-0.755	-0.386	-0.570
19	Bijnor	-0.165	2.579	1.207
20	Moradabad	0.267	-0.603	-0.168
21	Jyotibafule Nagar	-0.126	-0.603	-0.238
22	Rampur	-0.736	-0.675	-0.705
23	Farrukhabad	-1.306	-0.675	-0.990
24	Etawah	-0.716	-0.675	-0.695

Source: District Statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

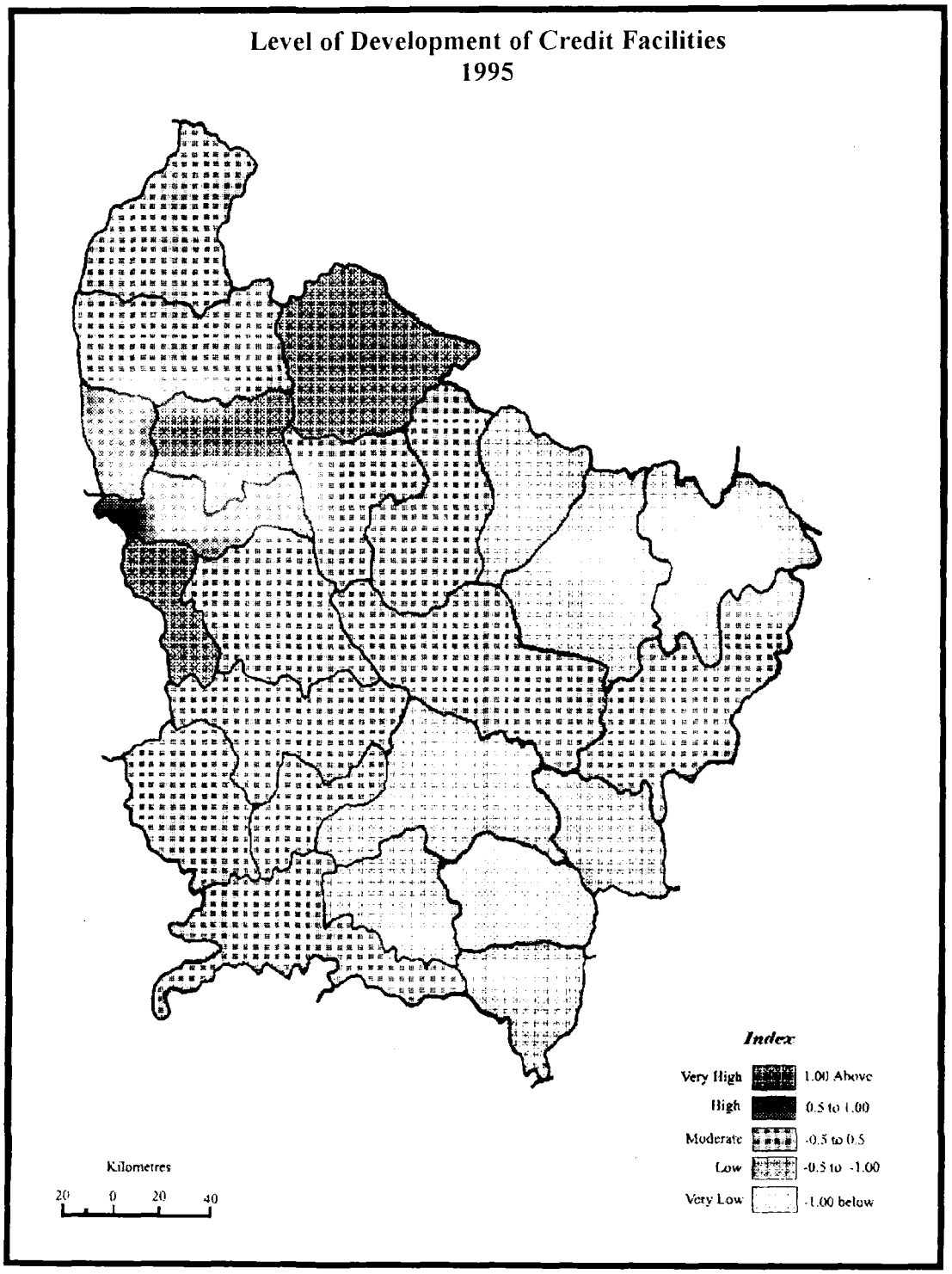
Level of Development of Credit Facilities
1995
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

FIG. 4.11

Table 4.12: Level of Development of Credit Facilities of Districts Ranked on the Basis of Composite Index for the year 2005

	Districts	Credit facilities		Composite Z-Score Credit Facilities
		Nationalized Bank Branches	Other	
1	Saharanpur	1.009	1.661	1.310
2	Muzaffar Nagar	1.161	-0.420	0.377
3	Meerut	1.748	-0.217	0.765
4	Baghpat	-0.772	-0.759	-0.765
5	Bulandshahar	0.725	-0.691	0.017
6	Ghaziabad	2.033	-0.353	0.840
7	Gautam Budha Nagar	0.327	-0.691	-0.182
8	Aligarh	-0.090	-0.488	-0.289
9	Hathras	-0.981	-0.285	-0.633
10	Mathura	0.706	0.663	0.684
11	Agra	1.786	1.002	0.392
12	Firozabad	-0.734	-0.759	-0.746
13	Mainpuri	-1.246	-0.759	-1.002
14	Etah	-0.772	-0.624	-0.698
15	Bareilly	0.479	1.408	0.943
16	Budaun	-0.526	1.340	0.407
17	Shahjahanpur	-0.128	1.273	0.572
18	Pilibhit	-0.621	-0.691	-0.656
19	Bijnor	0.024	2.831	1.427
20	Moradabad	0.194	-0.624	-0.215
21	Jyotibafule Nagar	-1.303	-0.556	-0.929
22	Rampur	-0.659	-0.691	-0.675
23	Farrukhabad	-1.246	-0.759	-1.002
24	Etawah	-1.113	-0.759	-0.936

Source: District Statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

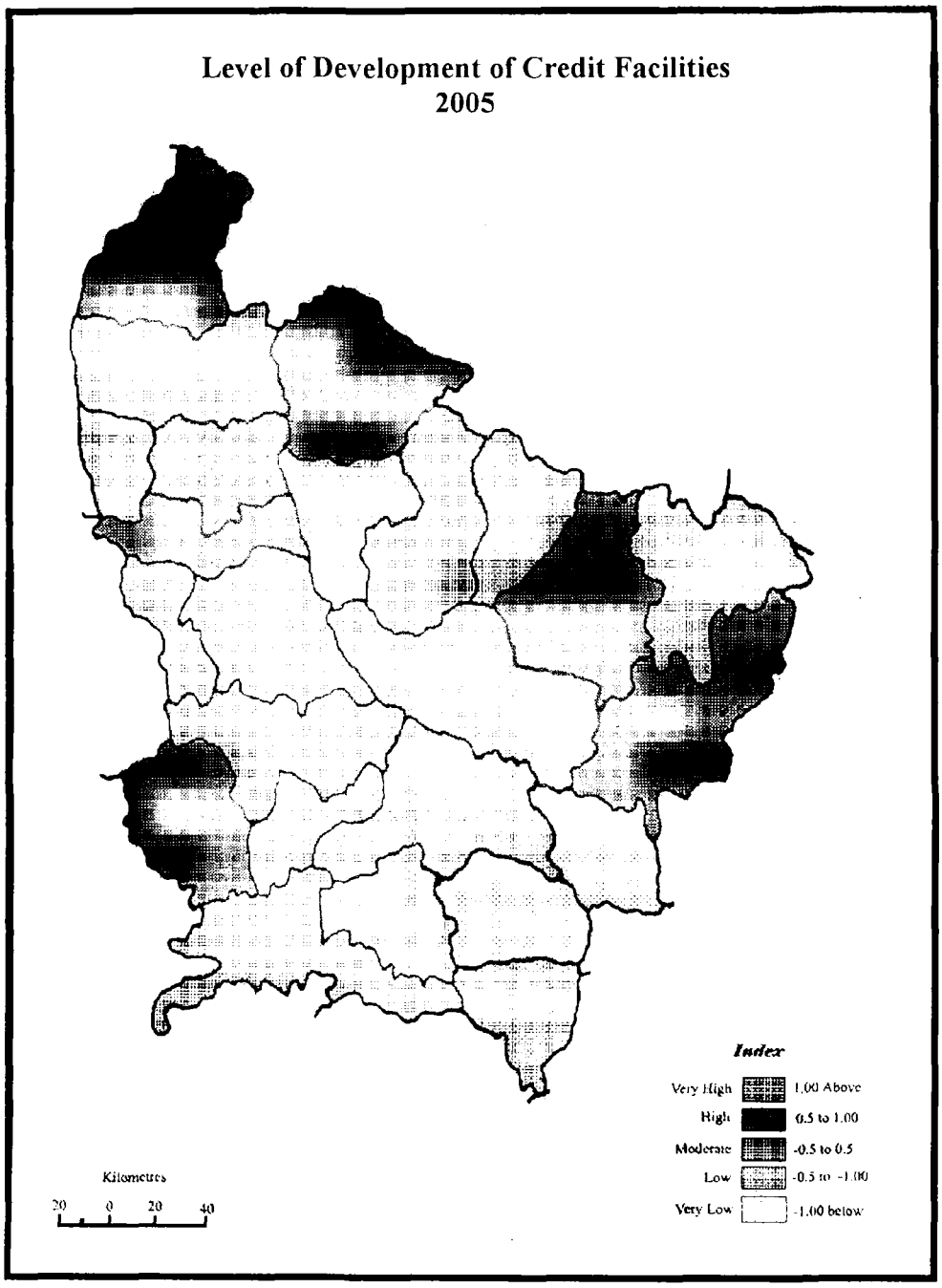
Level of Development of Credit Facilities
2005
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

FIG. 4.12

4.14). Another fact is that now, individual houses have less connectivity of telephones due to availability of mobile sets and accessibility to other equipments of communication at low prices.

As we know, the Western Uttar Pradesh is geographically located in the most fertile tract of Indo-Gangetic Plains, it has population density of 765 person per square km. operational land size holding is small and fragmented. The man land ratio is the highest.

The combination of agro-socio-economic indicators of the region is viewed that agriculture could be diversified and the food processing industry developed, which would give a strong boost to rural incomes and have major multiplier effects on employment and equitable income growth. Agribusiness could have a significant role in rural and economic development and could be a major source of rural non-farm employment and income.

Cropping intensity is the highest in western Uttar Pradesh and the region has the credit to grow a variety of crops in each season. Percentage of commercial crops grown are moderate while the districts Muzaffarnagar, Meerut, Baghpat, Mathura, Bijnor, Rampur, have maximum number of commercial crops (Table 4.15 & Fig. 4.15). Since the region is fully endowed with the advent of green revolution, the average production of food crops in quintal has little variability. The range varies from 30 to 20 Quintals. The districts Hathras and Jytibafule Nagar are exception among them. Their production is below 11 Quintals as an average.

Fertilizers used per hectare in kg and percentage of net area irrigated in gross irrigated area has depicting gloomy picture in the region as the western Uttar Pradesh is highly experiencing the innovation and diffusion of agricultural techniques, fertilizers used per hectare (kg) and irrigation facilities.

Substantial empirical evidence exists on the positive relationship between agricultural growth and economic development. Agricultural growth is

Table 2.13: District wise Level of Development of Communication Facilities for the Year 1995.

	Districts	Communication facilities	Composite Z-Score communication facilities
		No. of Telephones/ lakh population	
1	Saharanpur	0.040	0.040
2	Muzaffarnagar	0.441	0.441
3	Meerut	1.834	1.834
4	Baghpat	0.645	0.645
5	Bulandshahar	-0.746	-0.746
6	Ghaziabad	-0.494	-0.494
7	Gautam Budha Nagar	2.383	2.383
8	Aligarh	-0.048	-0.048
9	Hathras	-0.437	-0.437
10	Mathura	-0.004	-0.004
11	Agra	3.047	3.047
12	Firozabad	-0.375	-0.375
13	Mainpuri	-0.757	-0.757
14	Etah	-0.593	-0.593
15	Bareilly	0.019	0.019
16	Budaun	-0.696	-0.696
17	Shahjahanpur	-0.539	-0.539
18	Pilibhit	-0.702	-0.702
19	Bijnor	-0.274	-0.274
20	Moradabad	-0.438	-0.438
21	Jyotibafule Nagar	-0.794	-0.794
22	Rampur	-0.247	-0.247
23	Farrukhabad	-0.563	-0.563
24	Etawah	-0.602	-0.602

Source: District Statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

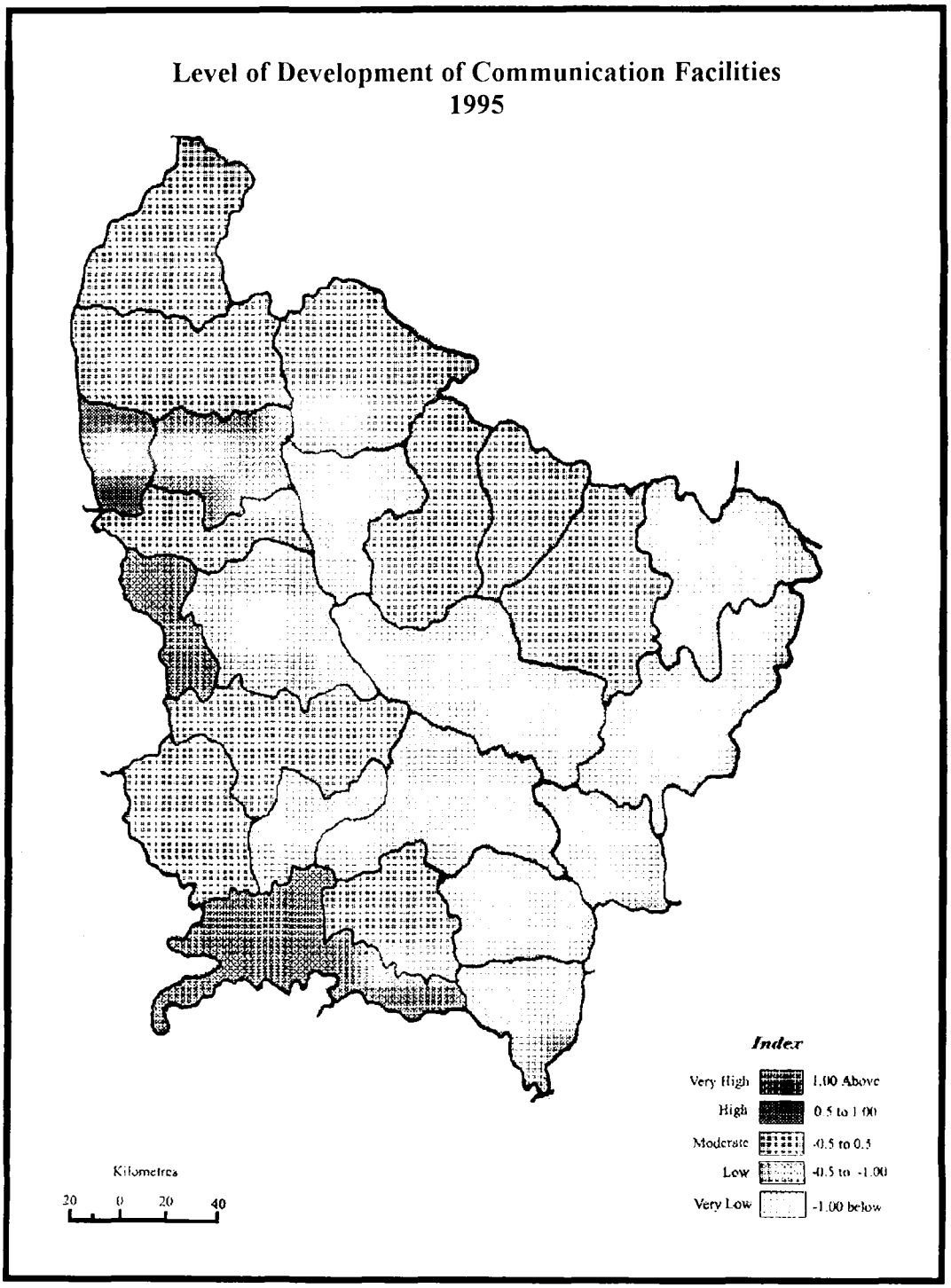
Level of Development of Communication Facilities
1995
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

FIG. 4.13

Table 4.14 : District Wise Level of Development of Communication Facilities for the Year 2005.

	Districts	Communication facilities	Composite Z-Score communication facilities
		No. of Telephones/ lakh population	
1	Saharanpur	0.223	0.223
2	Muzaffarnagar	-0.069	-0.069
3	Meerut	0.249	0.249
4	Baghpat	-0.289	-0.289
5	Bulandshahar	0.170	0.170
6	Ghaziabad	0.818	0.818
7	Gautam Budha Nagar	4.577	4.577
8	Aligarh	-0.217	-0.217
9	Hathras	-0.298	-0.298
10	Mathura	-0.154	-0.154
11	Agra	-0.056	-0.056
12	Firozabad	-0.327	-0.327
13	Mainpuri	-0.367	-0.367
14	Etah	-0.381	-0.381
15	Bareilly	-0.109	-0.109
16	Budaun	-0.474	-0.474
17	Shahjahanpur	-0.619	-0.619
18	Pilibhit	-0.432	-0.432
19	Bijnor	-0.110	-0.110
20	Moradabad	-0.694	-0.694
21	Jyotibafule Nagar	-0.300	-0.300
22	Rampur	-0.260	-0.260
23	Farrukhabad	-0.252	-0.252
24	Etawah	-0.287	-0.287

Source: District Statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

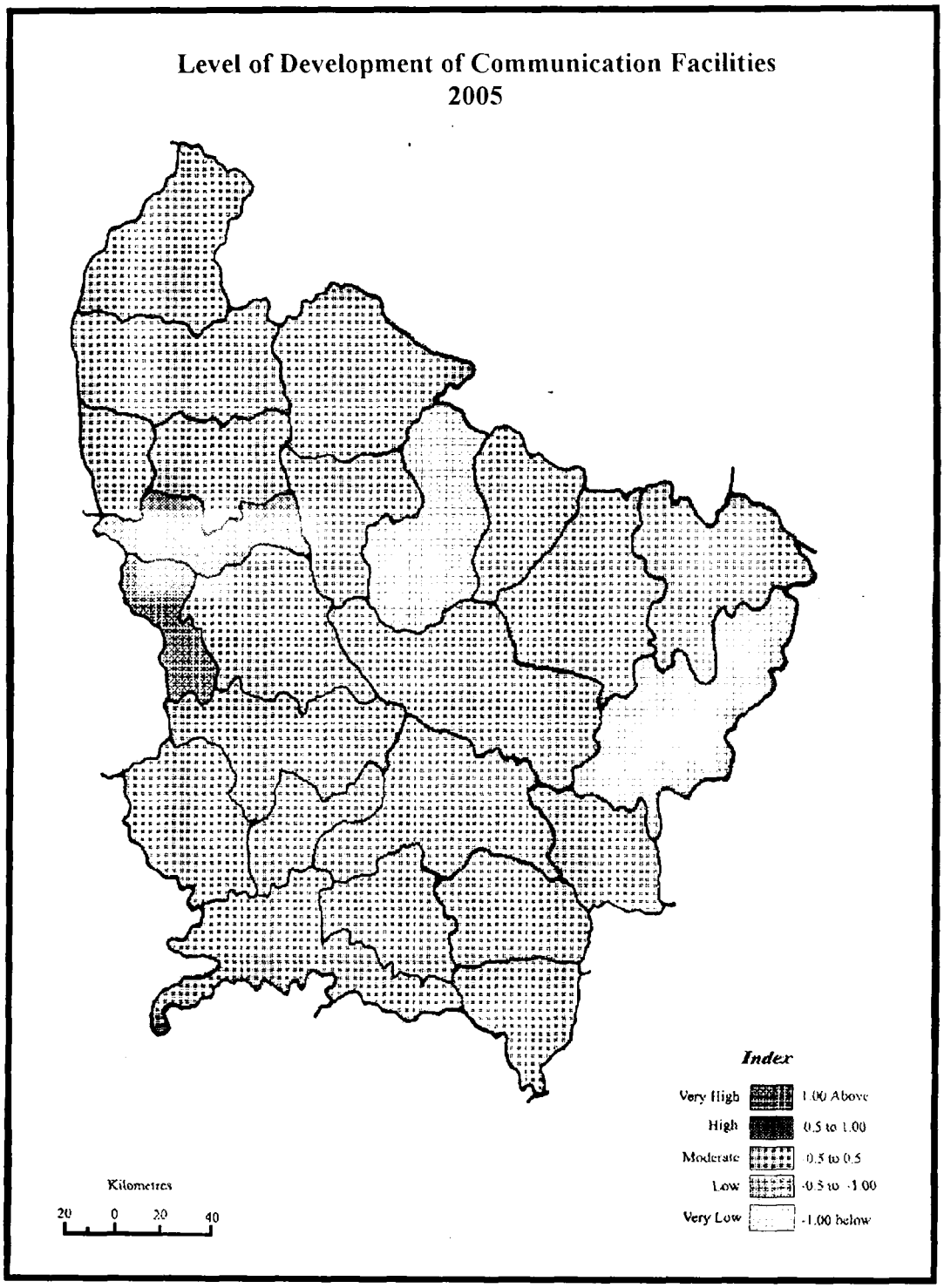
Level of Development of Communication Facilities
2005
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

FIG. 4.14

also a sort of essential condition for improving living standard of those who are dependent on agriculture.

Level of agro-socio-economic development of districts ranked on the basis of composite Z- score, 2005 is a combination of high, medium and low development. It has been seen that cropping intensity all along has a moving trend. The districts of Muzaffarnagar, Meerut, Baghpat, Agra, Bijnor and Saharanpur, maintained their positions in order of good percentage of area under commercial crops. (Table 4.16 and Fig. 4.16) Gawtam Budha Nagar is an exception, showing low level of area under commercial crops. Percentage of net irrigated area in gross area in total districts has not only maintained their rankings although they further moved to the top position.

In agro socio-economic development as a whole the districts of Meerut, Baghpat, Muzaffarnagar, Ghaziabad, Pilibhit, Bulandshahr, Shahjahanpur, Rampur and Saharanpur recorded high growth rate. Agricultural growth has played a historically important role in the process of economic development. It has been indicated that agriculture is the engine that contributed to growth in the non-agricultural sectors and to over all economic well being. Economic growth originating in agriculture can have a particularly strong impact in reducing poverty and hunger. Increasing employment and incomes in agriculture stimulates demand for non-agricultural goods and services, providing a boost to non-farm rural incomes as well.

Ranking on the basis of composite Z-score of economic development, Aligarh notably occupied the first position. The other districts in the rank, although not comparable are Muzaffarnagar, Bijnor, Meerut, Saharanpur, Agra, Ghaziabad and Moradabad (Table: 4.17 Figure 4.17). Jytibafule Nagar, Budaun, Farrukhabad, Pilibhit, Rampur, Bareilly registered poor or even the worst level of economic development.

Table 4.15: Level of Development of Agro –Socio Economic Indictors of Districts Ranked on the Basis of Composite Index for the year 1995

	Districts	Cropping Intensity	% of area under commercial crops	Average Production of food Crops (Quintals)	Fertilizer Used/ Hectare (Kg)	% of Net area irrigated in gross area	Composite Z-Score agro-socio –economic indictors
1	Saharanpur	0.581	0.535	-0.509	0.448	0.577	0.326
2	Muzaffarnagar	0.203	1.565	0.886	1.197	0.929	0.956
3	Meerut	0.499	1.359	1.441	0.573	1.275	1.029
4	Baghpat	0.499	1.359	1.441	-1.062	1.275	0.702
5	Bulandshahar	0.855	-0.888	0.599	-0.702	1.212	-0.024
6	Ghaziabad	0.602	-0.009	1.121	1.568	1.226	0.920
7	Gautam Budha Nagar	-1.561	-0.959	-0.507	0.261	-2.239	-1.001
8	Aligarh	0.661	-0.120	-0.127	-0.986	0.230	-0.068
9	Hathras	-2.032	-1.122	-2.372	-1.650	-1.511	-1.737
10	Mathura	-0.316	0.798	1.546	-0.814	-0.257	0.191
11	Agra	-0.890	2.638	0.012	0.089	-1.367	0.096
12	Firozabad	-0.094	0.027	-0.055	-0.778	-0.512	-0.282
13	Mainpuri	0.731	-0.809	0.105	-0.887	0.678	-0.037
14	Etah	0.698	-1.020	-0.501	-0.667	-0.277	-0.353
15	Bareilly	0.012	-0.105	-0.752	0.759	0.108	0.046
16	Budaun	0.178	-0.866	-0.752	-0.600	-0.973	-0.602
17	Shahjahanpur	0.696	-0.805	-0.937	-0.246	0.101	-0.238
18	Bilibhit	0.943	-0.530	0.405	1.099	0.632	0.509
19	Bijnor	-2.419	1.073	0.491	2.631	1.150	0.585
20	Moradabad	0.458	-0.212	-0.110	0.890	0.054	0.216
21	Jutibafule Nagar	-2.042	-0.968	-2.296	-0.306	-1.537	-1.429
22	Rampur	1.100	-0.918	0.947	0.426	0.639	0.438
23	Farrukhabad	0.481	0.549	-0.087	-0.022	-0.842	0.158
24	Etawah	0.159	-0.573	-0.292	-0.229	-0.517	-0.501

Source: District Statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

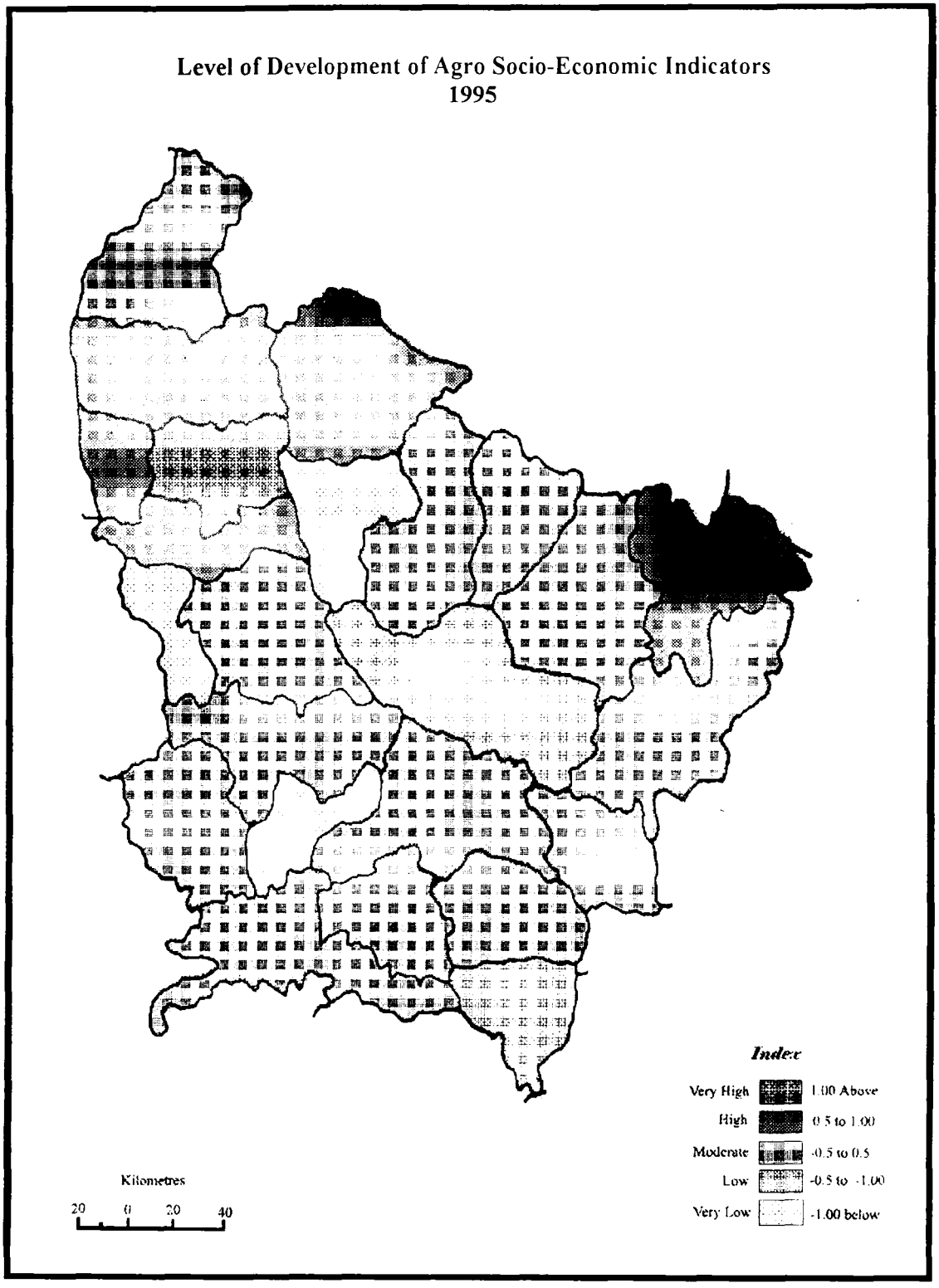
Level of Development of Agro Socio-Economic Indicators
1995
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

FIG. 4.15

Table 4.16: Level of Development of Agro –socio economic indictors of districts ranked on the basis of composite index for the year 2005

	Districts	Cropping Intensity	% of area under commercial crops	Average Production of food Crops (Quintals)	Fertilizer Used/ Hectare (Kg)	% of Net area irrigated in gross area	Composite Z-Score agro-socio-economic indictors
1	Saharanpur	-0.275	0.686	-0.494	0.424	0.210	0.110
2	Muzaffar Nagar	-0.555	1.693	1.357	1.406	1.090	0.998
3	Meerut	-0.256	1.673	2.079	1.245	1.114	1.171
4	Baghpat	0.002	1.417	2.269	1.084	1.201	1.194
5	Bulandshahar	0.660	-0.602	0.482	0.108	1.114	0.352
6	Ghaziabad	-0.061	0.670	1.318	1.073	1.114	0.822
7	Gautam Budha Nagar	-2.740	-1.682	0.658	-0.813	1.114	-0.692
8	Aligarh	0.539	-0.767	-0.446	-1.103	-0.349	-0.425
9	Hathras	0.152	-0.189	-0.460	-0.759	-0.685	-0.388
10	Mathura	-0.684	0.223	0.379	-1.394	-0.636	-0.422
11	Agra	-1.674	1.839	-0.114	-0.752	-2.477	-0.635
12	Firozabad	-0.033	-0.119	-0.382	-0.365	-1.353	-0.450
13	Mainpuri	1.487	-1.022	-0.665	-0.413	0.889	0.055
14	Etah	0.238	-1.120	-1.269	-1.272	-0.321	-0.748
15	Bareilly	0.720	-0.315	-1.389	0.049	0.287	-0.129
16	Budaun	0.621	-0.931	-1.806	-1.138	-1.523	-0.958
17	Shahjahanpur	0.383	-0.670	0.174	0.808	0.636	0.211
18	Pilibhit	1.125	-0.566	0.759	0.499	0.840	0.489
19	Bijnor	-1.551	1.446	0.261	-0.431	-0.075	-0.070
20	Moradabad	1.129	-0.535	-0.953	0.335	-0.110	-0.026
21	Jyotibafule Nagar	-0.359	0.445	-0.712	1.207	-0.196	0.076
22	Rampur	1.747	-1.165	-0.130	-0.452	0.699	0.139
23	Farrukhabad	-0.748	0.011	-0.374	2.158	-0.971	0.015
24	Etawah	0.132	-0.422	-0.335	-1.502	-1.337	-0.692

Source: District statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

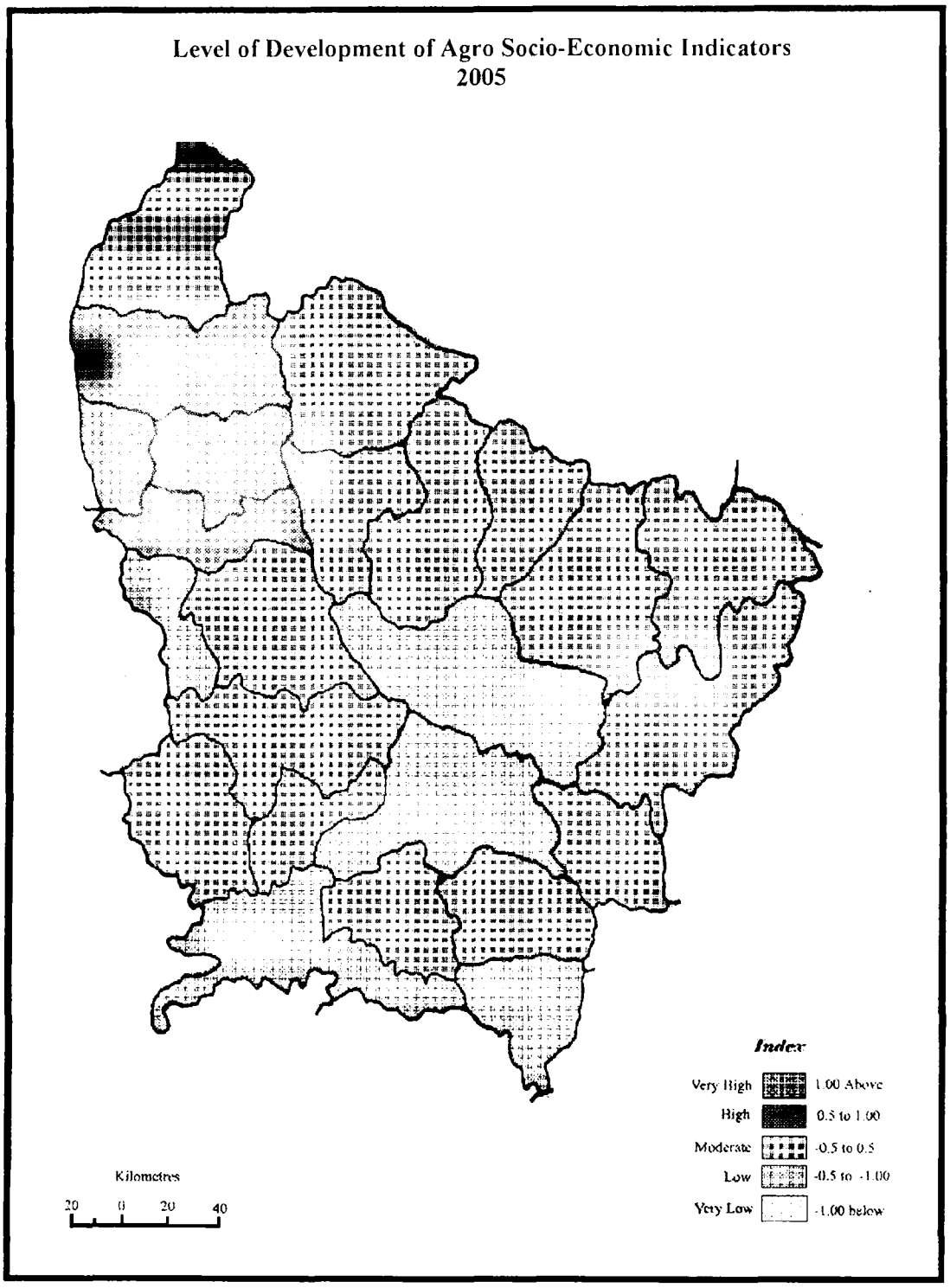
Level of Development of Agro Socio-Economic Indicators
2005
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20
0
20
40

FIG. 4.16

Reforms in the agricultural sector are an important step toward increasing growth rates and reducing poverty sustainably. But many house holds are not in a position to share in economic growth because of their low asset base (for example, poor nutrition, low education and few physical assets).

But levels of economic development in 2005, after a gap of almost one decade, Mathura stood at top position leaving others behind. Ghaziabad at second position in ranking, drastically improved on economic front (Table 4.18 and Fig. 4.18). Muzaffarnagar is an exception whose economic standard has slowed down badly. On the other hand, there is no any further improvement in the economic standards of Pilibhit, Jytibafule Nagar, Rampour, Hathras and Etawah.

As the government expenditure on rural development has declined, it public support for agriculture has had far reaching consequences for growth in agricultural productivity and rural employment, the decline in agricultural productivity having deepened rural poverty. Growth and employment in agriculture will sufer unless public investment in agriculture is sharply increased. Employment can also be raised significantly through food for work. programmes. Generating productive employment is central to sustained poverty reduction as the labour is the main asset for the majority of the poor. The relationship between poverty and employment operates through labour market, quality and quantity of employment. Rural house holds are traditionally depended on agriculture for their livelihoods. It is now recognized that expansion of rural non-farm employment is important for improving the incomes of rural house holds.

In the study area, there are regional imbalances in socio economic development. Economic inequality increased within regions and between urban and rural areas. On the social sector, there have been achievements in education sector, increase in literacy and enrolment rates while the decline in infant mortality rate is a positive sign.

Table 4.17: Level of Development of Economic Indictors of Districts Ranked on the Basis of Composite Index for the year 1995

	Districts	Income			Credit facilities		Communication facilities	Composite Z-Score economic indictors
		Deposit in National income (in lakh)	Deposited money/ person	Actual Expenditure	Nationalized Bank Branches	Other	No. of Telephones/ lakh population	
1	Saharanpur	0.523	0.410	-0.419	0.837	-0.675	0.040	1.193
2	Muzaffarnagar	0.084	0.263	-0.419	0.936	-0.386	0.441	2.531
3	Meerut	2.603	1.628	-0.419	2.509	0.265	1.834	1.342
4	Baghpat	-0.568	0.057	-0.420	0.169	1.422	0.645	0.217
5	Bulandshahar	-0.028	-0.066	-0.419	0.837	-0.603	-0.746	-1.708
6	Ghaziabad	1.523	-2.817	-0.419	2.037	-0.169	-0.494	0.882
7	Gautam Budha Nagar	-0.033	0.810	-0.420	0.070	2.869	2.383	0.946
8	Aligarh	1.384	0.633	3.148	0.208	-0.386	-0.048	8.231
9	Hathras	-0.038	-0.856	-0.420	-0.519	0.699	-0.437	-0.278
10	Mathura	-1.493	0.599	-0.419	0.660	-0.386	-0.004	-0.177
11	Agra	1.731	-.723	-0.419	1.191	-0.386	3.047	1.147
12	Firozabad	-0.278	-0.177	1.376	-0.913	-0.675	-0.375	-1.737
13	Mainpuri	-0.893	-0.738	-0.419	-1.345	-0.675	-0.757	-0.804
14	Etah	-0.682	-0.706	-0.419	-0.873	-0.603	-0.593	-0.646
15	Bareilly	-0.095	0.274	-0.419	-0.306	-0.530	0.019	-3.428
16	Budaun	-0.994	-0.894	2.713	-0.657	0.121	-0.696	-6.784
17	Shahjahanpur	-0.758	-0.505	-0.419	-0.303	1.133	-0.539	-2.318
18	Pilibhit	-1.036	-0.457	-0.419	-0.755	-0.386	-0.702	-6.258
19	Bijnor	-0.603	-0.207	-0.419	-0.165	2.579	-0.274	1.518
20	Moradabad	0.549	-1.498	-0.419	0.267	-0.603	-0.438	-0.362
21	Jyotibafule Nagar	-0.557	-1.602	-0.420	-0.126	-0.603	-0.794	-6.837
22	Rampur	-1.188	-0.505	1.148	-0.736	-0.675	-0.247	-3.671
23	Farrukhabad	-0.262	-0.634	-0.419	-1.306	-0.675	-0.563	-6.431
24	Etawah	0.536	-0.368	-0.419	-0.716	-0.675	-0.602	-0.374

Source: District statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

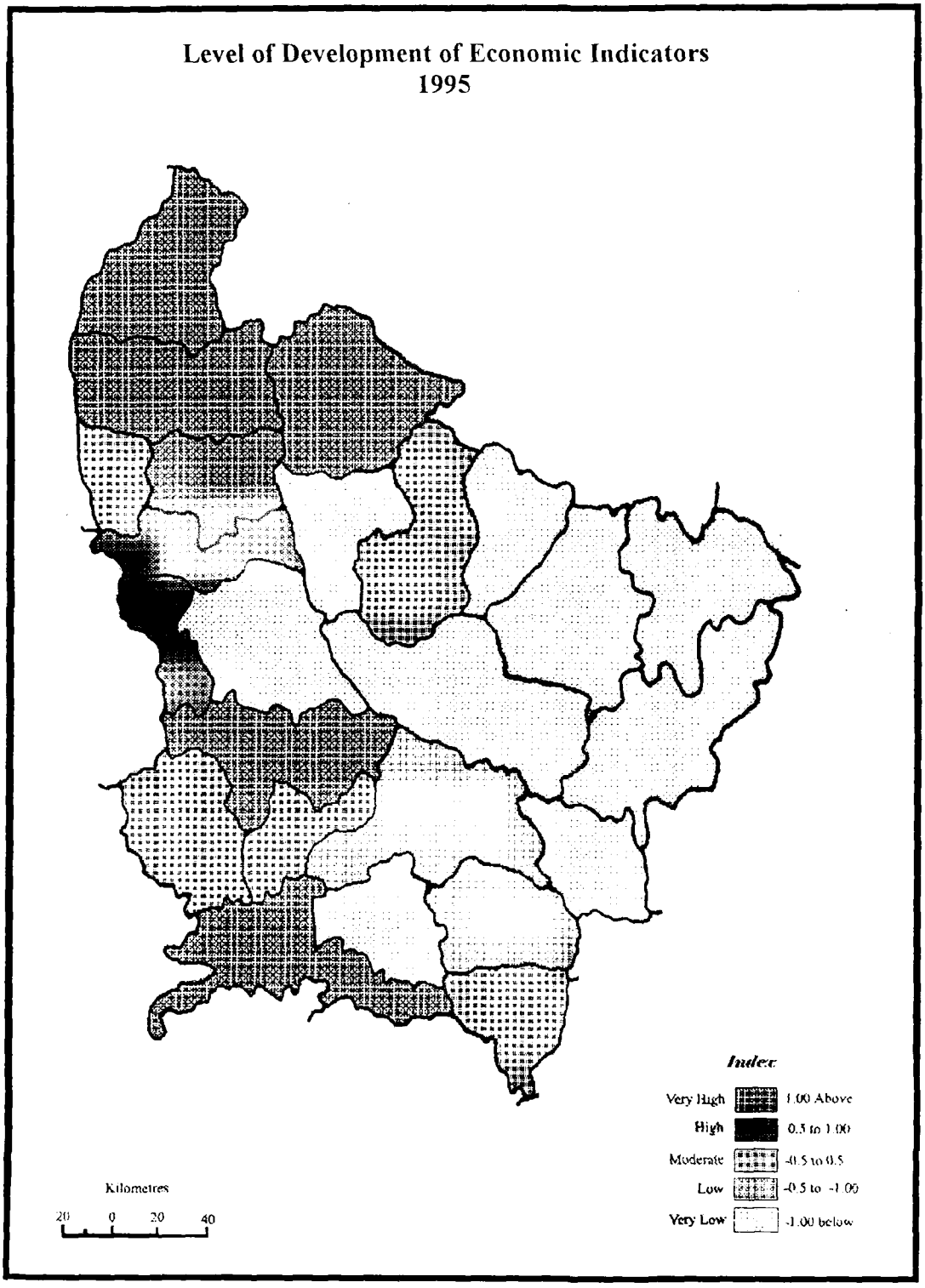
Level of Development of Economic Indicators
1995
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20
0
20
40

FIG. 4.17

Table 4.18 : Level of Development of Economic indictors of districts ranked on the basis of composite index for the year 2005

	Districts	Income			Credit facilities		Communication facilities	Composite Z-Score economic indictors
		Deposit in National income (in lakh)	Deposited money/ person	Actual Expenditure	Nationalized Bank Branches	Other	No. of Telephones/ lakh population	
1	Saharanpur	-0.225	0.000	-0.426	1.009	1.661	0.223	3.654
2	Muzaffarnagar	-0.210	-0.185	-0.426	1.161	-0.420	-0.069	-2.484
3	Meerut	-0.167	0.659	-0.426	1.748	-0.217	0.249	3.077
4	Baghpat	-0.268	-0.289	-0.426	-0.772	-0.759	-0.289	-4.671
5	Bulandshahar	-0.198	-0.113	-0.426	0.725	-0.691	0.170	-0.079
6	Ghaziabad	-0.006	1.446	-0.427	2.033	-0.353	0.818	5.851
7	Gautam Budha Nagar	-0.184	3.957	-0.427	0.327	-0.691	4.577	1.292
8	Aligarh	-0.211	0.551	3.200	-0.090	-0.488	-0.217	0.457
9	Hathras	-0.270	-0.280	-0.408	-0.981	-0.285	-0.298	-4.204
10	Mathura	-0.268	-0.048	-0.426	0.706	0.663	-0.154	9.484
11	Agra	-0.164	0.921	-0.426	1.786	1.002	-0.056	0.510
12	Firozabad	-0.249	-0.329	1.741	-0.734	-0.759	-0.327	-0.109
13	Mainpuri	-0.271	-0.405	-0.426	-1.246	-0.759	-0.367	-0.579
14	Etah	-0.257	-0.507	-0.426	-0.772	-0.624	-0.381	-0.494
15	Bareilly	-0.200	-0.076	-0.425	0.479	1.408	-0.109	0.179
16	Budaun	-0.264	-0.636	-0.426	-0.526	1.340	-0.474	-1.644
17	Shahjahanpur	-0.262	-0.941	-0.426	-0.128	1.273	-0.619	-1.838
18	Pilibhit	-0.268	-0.456	-0.426	-0.621	-0.691	-0.432	-4.824
19	Bijnor	-0.242	-0.348	-0.427	0.024	2.831	-0.110	0.288
20	Moradabad	4.771	-0.939	-0.427	0.194	-0.624	-0.694	3.801
21	Jyotibafule Nagar	-0.207	-0.514	1.168	-1.303	-0.556	-0.300	-2.858
22	Rampur	-0.265	-0.500	-0.426	-0.659	-0.691	-0.260	-4.668
23	Farrukhabad	-0.262	-0.943	-0.426	-1.246	-0.759	-0.252	-0.648
24	Etawah	-0.251	-0.120	2.397	-1.113	-0.759	-0.287	-2.217

Source: District statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

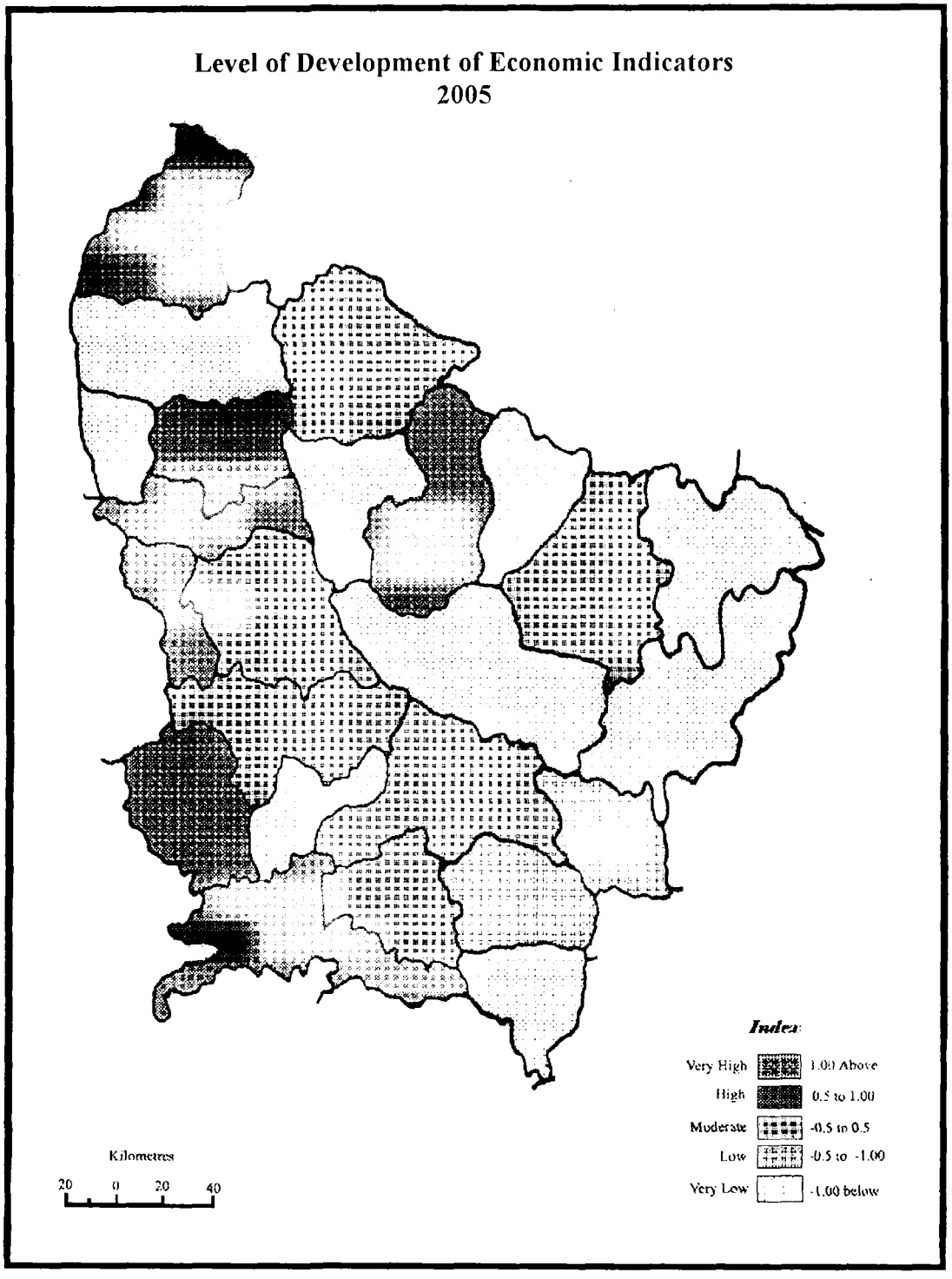
Level of Development of Economic Indicators
2005
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

Fig. 4.18

Social indicators of 1995, on the basis of composite Z-score showed development of social standard on the one side and declining trend of social development on the other side. Bulandshahar, Mathura, Aligarh, Firozabad, Farrukhabad, Saharanpur, have good social credentials (Table 4.19 & Fig 4.19) Etah, Baghpat, Jyotibafule Nagar, Pilibhit, Rampur, Budaun have worst records on social development indicators. The regions should required to reorient its social safety nets to create more employment in rural areas; help strengthen the human resource base through education, and improvement in physical infrastructure. Various social assets and educational programmers should be transformed from social assistance to social development programmes that contribute directly to the creation of physical and social assets.

In a gap of ten years, by 2005 remarkable changes have been seen on social development. Etah, has advanced on the basis of composite index and has been listed under the category of high developed region Gautam Budha Nagar has also shown an improvement on social standards and categorized at second position (Table 4.20 and Fig. 4.20). Mathrua, Baghpat, Mainpuri, Jyotibafule Nagar, Ghaziabad and Meerut have shown no indication in advancement of their social status.

It is of the common opinion that high levels of poverty in Uttar Pradesh, contribute to its overwhelming poor levels of performance on social indicators of development. Civil society has not challenged the oppressive system of class, caste and gender relations and this has enabled Uttar Pradesh to remain in a state of relative low inertia in terms of development.

The analysis on rural development shows that agricultural technology is an important force for raising agricultural growth. Agricultural growth and development of the rural non-farm sector are important for creating productive employment, which in turn produces rural poverty. Poverty is predominantly rural, where landless labourers and casual workers are the worst off economic group. At the other end of the scale are better health facilities, education and awareness which are key developmental priorities. Related social and economic activities that seek to enhance the production potential of an area on a sustainable basis.

Table 4.19: Level of Development of Social Indicators of Districts Ranked on the Basis of Composite index for the Year 1995.

		EDUCATION								ROAD WAYS	ELECTRICITY			Health centers			Composi Z-Score social indictor
	Districts	No. of Schools/ Per lakh Population				Teacher pupil Ratio				Total length of roads (Km)	% of electrified Villages in total Inhabited Villages	% of electricity consumption in agricultural division	Per head electricity consumption (kw/hrs)	Primary health centers	Family & mother child Welfare centre	Family & mother child welfare sub-centre	
		Junior Basic School	Senior Basic School	Higher Secondary School	Degree College	Junior Basic School	Senior Basic School	Higher Secondary School	Degree College								
1	Saharanpur	0.121	0.069	0.923	-0.548	0.035	-0.062	0.126	0.620	1.043	0.463	-0.054	0.201	0.831	-0.202	0.467	2.684
2	Muzaffarnagar	0.888	-0.059	-0.977	-0.239	0.687	0.075	-0.085	-0.742	-0.877	2.324	0.843	0.382	1.064	0.359	1.208	0.323
3	Meerut	0.837	-0.759	2.757	0.151	1.616	1.595	2.020	-0.278	-0.338	-1.102	0.031	3.360	1.210	0.759	0.777	0.842
4	Baghpat	-0.645	-1.534	1.381	-0.474	0.147	-0.854	-0.997	-2.099	-0.953	1.438	-1.607	1.287	-3.038	-0.583	-0.071	-7.405
5	Bulandshahar	0.735	0.282	-0.453	0.348	1.177	2.019	0.897	0.831	2.420	1.902	1.893	0.225	1.120	1.087	-1.495	8.658
6	Ghaziabad	0.275	-1.099	-0.322	-0.778	-0.129	-0.056	1.038	-0.014	-0.439	0.126	0.345	1.382	0.847	-1.130	3.513	2.372
7	Gautam Budha Nagar	-1.156	-2.450	-1.239	-1.394	-2.438	-0.848	-1.558	-2.092	-0.952	-0.707	-0.957	-0.781	-0.869	-1.568	0.663	-1.223
8	Aligarh	0.990	1.298	-0.257	1.378	0.938	1.583	0.687	0.101	-0.482	-0.605	-0.462	0.317	1.113	-0.517	0.822	4.602
9	Hathras	-0.134	-0.882	-0.584	-0.463	-1.145	-0.816	-1.277	-1.432	-0.934	-1.430	-1.620	-1.910	-1.102	-1.136	-0.224	-1.006
10	Mathura	-0.083	0.553	-0.388	-0.494	-0.430	0.791	0.827	-0.138	1.438	-0.520	-1.450	-0.035	1.191	0.837	0.749	7.827
11	Agra	0.173	0.287	0.333	0.098	0.173	0.748	0.126	0.246	-0.278	0.028	-0.704	0.576	0.104	-0.896	0.623	1.091
12	Firozabad	-1.105	0.068	-0.846	0.364	-0.957	0.150	2.440	1.791	0.033	1.098	1.708	-0.764	0.809	1.468	-0.128	3.934
13	Mainpuri	-0.543	1.397	-1.174	1.605	-1.183	0.224	-0.295	-0.649	-0.604	0.553	-0.126	-0.548	0.064	2.151	-0.754	0.001
14	Etah	0.377	0.764	-0.650	1.181	0.210	0.299	0.266	0.067	-0.378	-1.185	-1.037	-0.078	-0.302	1.320	-0.999	-9.666
15	Bareilly	0.633	0.084	-0.126	0.384	0.737	-0.636	-0.506	1.298	-0.459	1.230	1.277	0.057	-0.194	-1.534	-0.085	0.144
16	Budaun	-0.696	0.507	0.661	-0.229	0.411	-1.290	-1.067	-0.361	-0.464	-0.177	0.036	-0.605	-0.033	0.285	-0.562	-2.437
17	Shahjahanpur	0.173	1.349	-0.388	-0.045	0.085	-1.315	-0.926	-0.703	-1.153	-0.143	1.119	-0.688	-1.401	0.323	-0.832	-0.302
18	Pilibhit	-1.821	0.483	-1.370	-0.130	-1.434	-0.947	-0.295	0.701	-0.474	0.356	0.811	-0.771	-0.907	-0.248	-0.547	-4.395
19	Bijnor	-0.032	0.030	1.316	-0.546	-0.166	-0.262	-0.155	-0.836	2.836	0.735	-0.315	0.500	0.079	-1.322	-0.253	1.072
20	Moradabad	2.575	-0.691	1.643	-1.506	1.992	-0.636	0.056	1.296	0.526	-0.739	0.736	0.290	0.675	0.367	-0.044	0.493
21	Jyotibafule Nagar	1.399	-1.506	0.071	-1.750	0.122	-1.446	-1.277	-0.154	0.021	-1.442	-0.176	-0.276	-0.511	0.009	-0.728	-5.488
22	Rampur	-0.952	-0.055	0.333	-0.628	-1.246	-0.897	-1.067	1.240	0.280	-0.126	-1.176	-0.682	-0.212	-0.036	-0.511	-3.824
23	Farrukhabad	-0.083	0.044	0.136	1.110	0.649	1.221	0.617	0.923	0.182	0.701	0.997	-0.413	0.173	0.665	-0.849	3.918
24	Etawah	-1.923	1.820	-0.781	2.604	0.147	1.358	0.406	0.383	0.006	0.098	0.059	-0.405	-0.173	1.218	-0.751	2.350

Source: District statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

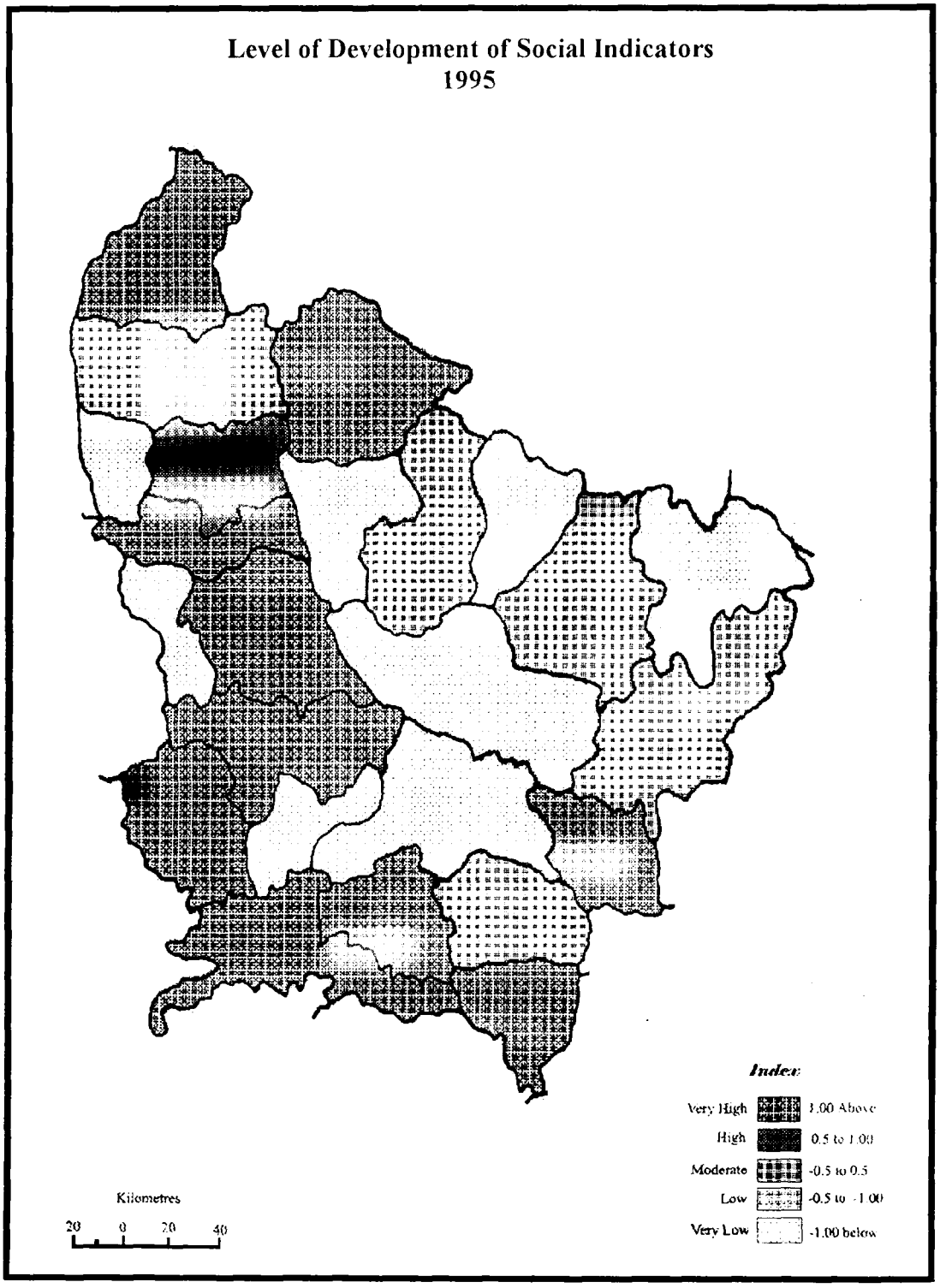
Level of Development of Social Indicators
1995
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

Fig. 4.19

Table 4.20 : Level of Development of Social Indicators of Districts Ranked on the Basis of Composite Index for the Year 2005.

		EDUCATION								ROADWAYS	ELECTRICITY			Health centers			Compo Z-Sco soci indict
	Districts	No. of Schools/ Per lakh Population				Teacher pupil Ratio				Total length of roads (Km)	% of electrified Villages in total Inhabited Villages	% of electricity consumption in agricultural division	Per head electricity consumption in (kw/hrs)	Primary health centres	Family & mother child Welfare centre	Family & mother child welfare sub- centre	
		Junior Basic School	Senior Basic School	Higher Secondary School	Degree College	Junior Basic School	Senior Basic School	Higher Secondary School	Degree College								
1	Saharanpur	0.374	-0.754	0.943	-0.703	0.752	-0.270	-0.492	-0.772	-1.088	2.776	-0.173	0.723	1.206	-0.179	0.047	1.59
2	Muzaffar Nagar	1.321	0.213	-0.735	0.128	1.562	-0.421	-0.099	-0.641	-0.774	-0.587	-0.782	1.483	1.205	-0.309	0.411	1.31
3	Meerut	0.764	-0.483	1.463	0.243	0.198	-0.145	-0.989	-0.897	-0.492	-1.183	-0.614	0.629	1.273	-0.826	0.270	-0.05
4	Baghpat	-1.297	-0.583	-0.330	-0.725	-0.627	0.224	1.307	-1.436	1.236	-1.024	-0.405	-1.477	1.210	1.668	0.063	-0.14
5	Bulandshahar	0.931	0.087	1.868	0.191	1.420	1.385	-0.394	-0.282	1.772	-1.278	-0.865	0.536	-0.100	0.786	-0.188	3.91
6	Ghaziabad	0.541	-0.598	-0.446	-0.551	0.041	-0.805	0.620	-0.976	-1.004	-0.684	-0.386	1.431	1.047	-1.515	1.536	-0.11
7	Gautam Budha Nagar	-2.022	-0.150	-1.314	0.085	-2.133	-0.047	3.957	1.978	2.948	2.090	-0.734	-0.971	0.813	-0.561	4.090	5.35
8	Aligarh	0.318	-0.783	-0.446	-0.798	0.368	1.016	-0.328	1.974	1.266	-0.965	2.091	0.408	-0.417	-0.218	-0.095	2.26
9	Hathras	-0.907	0.654	-0.677	0.283	-1.252	0.778	0.032	-0.789	0.138	1.250	0.331	-1.186	1.210	0.873	-0.295	2.95
10	Mathura	-0.128	-0.729	-0.967	-0.683	-0.413	0.537	-0.361	1.206	-0.036	-0.026	-0.733	-0.346	0.989	-1.377	0.285	-0.19
11	Agra	0.652	-0.985	0.422	-1.183	0.937	1.012	-0.394	-0.329	-0.239	-0.274	-0.652	1.583	0.380	-1.353	0.728	2.05
12	Firozabad	-0.573	-0.849	-0.735	-0.548	-0.413	0.171	-0.754	1.218	1.282	-0.586	-0.549	-0.776	-1.023	-0.402	0.206	-0.31
13	Mainpuri	-0.239	1.654	-0.909	1.381	-0.598	0.699	-0.361	-1.094	-1.177	-0.383	-0.569	-0.468	-0.667	1.283	-0.694	-0.14
14	Etah	0.708	0.960	-0.446	1.326	0.980	1.506	0.457	0.261	-0.449	0.223	-0.757	0.266	-1.523	1.204	-0.655	2.82
15	Bareilly	0.931	0.141	-0.099	-0.026	1.363	-1.510	-0.688	0.535	-0.238	0.475	0.144	1.858	-0.305	-1.417	-0.394	5.13
16	Budaun	1.209	-0.458	2.389	-0.482	0.838	-1.141	-0.296	1.254	0.102	-0.844	-0.640	-0.083	1.210	1.687	-0.595	0.24
17	Shahjahanpur	0.095	0.896	-0.099	-0.263	0.653	-0.771	-0.296	0.315	-0.129	0.582	-0.367	-0.561	-0.459	-0.156	-0.591	-5.69
18	Pilibhit	-1.186	0.269	-1.025	0.359	-0.726	-0.824	-0.590	0.975	0.149	0.076	1.547	-0.711	-1.302	-0.087	-0.707	-0.25
19	Bijnor	0.652	0.250	1.290	-0.163	0.553	-0.236	-0.557	-0.623	-0.149	-0.489	-0.281	0.679	0.192	0.708	-0.178	1.09
20	Moradabad	1.599	-2.918	0.885	-2.379	0.923	-2.724	-1.178	0.448	-0.582	-0.277	-0.250	1.048	-0.183	-0.621	-0.934	-0.47
21	Jyotibafule Nagar	-0.295	0.416	-1.082	-0.025	-1.323	1.099	-0.132	-1.186	0.030	1.460	0.398	-1.110	-1.628	1.618	-0.229	-0.13
22	Rampur	-0.406	0.910	0.885	0.375	-1.153	-0.922	0.391	0.433	-0.893	-0.320	3.217	-0.762	-1.223	-0.728	-0.447	-4.28
23	Farrukhabad	-0.907	0.793	-0.562	1.332	-0.755	0.586	0.424	-0.893	-0.717	-0.220	-0.290	-1.468	-1.243	0.440	-0.551	-2.68
24	Etawah	-2.133	2.047	-0.272	2.824	-1.195	0.804	0.719	-0.681	-0.957	0.209	1.136	-0.725	-0.662	-0.519	-0.473	8.13

Source: District statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

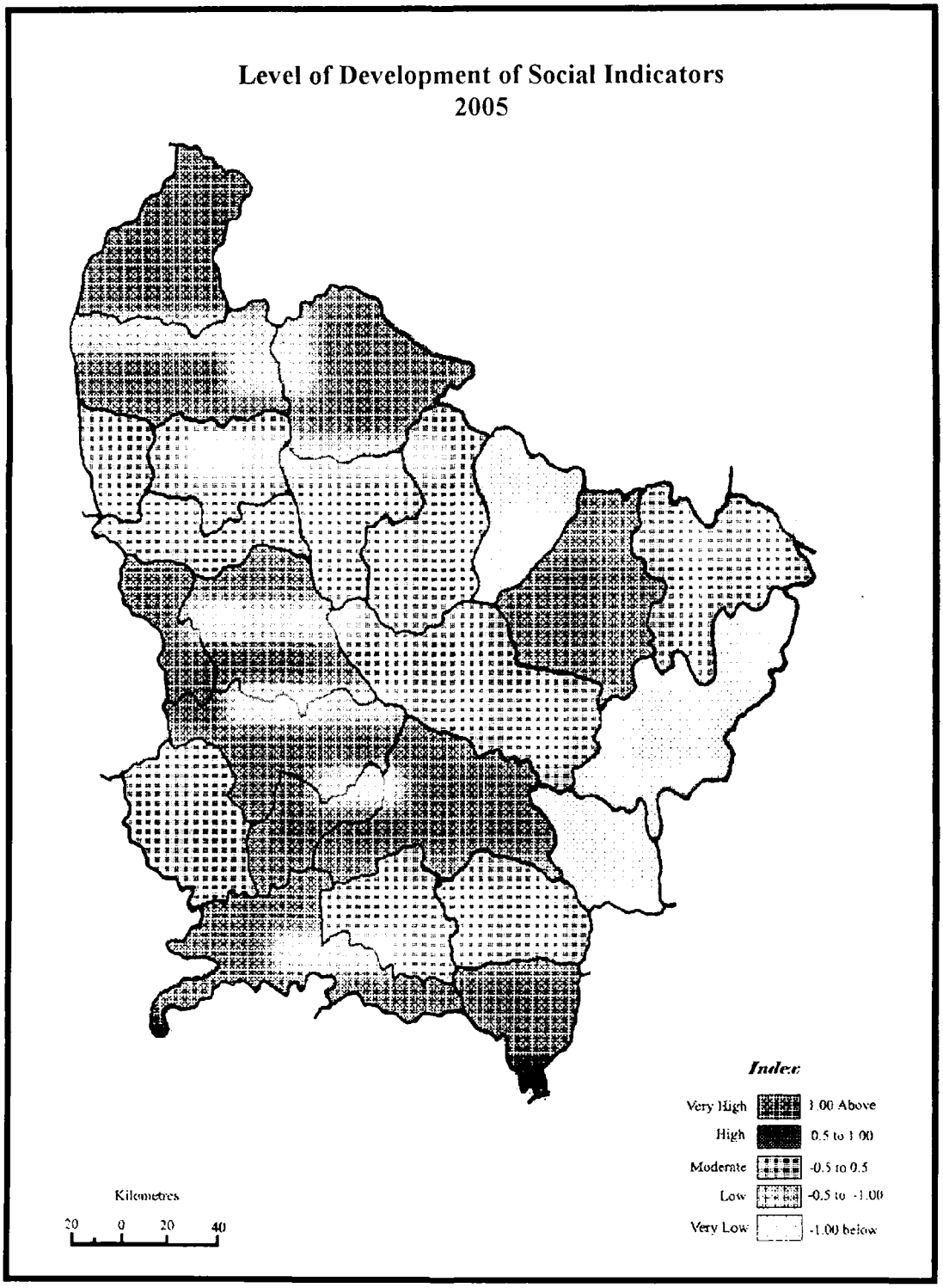
Level of Development of Social Indicators
2005
Index
Very High
1.00 Above
High
0.5 to 1.00
Moderate
-0.5 to 0.5
Low
-0.5 to -1.00
Very Low
-1.00 below
Kilometres
20 0 20 40

FIG. 4.20

INTER CORRELATION BETWEEN AGRO-SOCIO-ECONOMIC INDICATORS AND SOCIO-ECONOMIC INDICATORS DURING 1995 to 2005.

Regression analysis postulates a cause relationship between a dependent variable and one or more independent variables. The dependent variable is supposed to be functionally dependent on other variables. The regression model attempts to explain observed changes in a dependent variable as being caused by changes in the independent. Changes in the independent variables are obtained independently in the casual relations expressed by the model.

The casual relation between the dependent variables (Y) and the independent variables (X1, X2,..... X'',,) may be of any implicit functional form. But the available techniques of estimation require the function as explicit function.

An explicit functional form widely used to express the casual relations between a dependent variable and independent variable in the linear from. Even if the relation is not linear, when the relevant range of operation is small, the linear form may adequately represent the true functional form. The linear relation may be expressed as:

$$Y= B0+B1+X1+B2+X2+.....BkXK+U$$

The data consists of n observations on dependent (response) variable Y and k independent (explanatory)

$$\text{Variables } X1, X2,.....XK^3$$

The correlation coefficient is either +1 or -1 in condition when all actual values are on the regression line, prediction is exact and the relation between the two variables is perfect. When the actual values are not identical with

regression estimates, the prediction is not precise and the relationship between the variables is not perfect. In such situation, the correlation coefficient is between -1 and +1. The correlation between two variables x and Y is described as:

$$r = \frac{\text{Covariance}(x,y)}{\sqrt{\text{Var.x}}\sqrt{\text{Var.y}}} = \frac{\sum(xi-\bar{x})(yi-\bar{y})}{\sqrt{(x1-\bar{x})^2}\sqrt{\sum(yi-\bar{y})^2}}$$

Where, r is the correlation coefficient. This can be negative or positive. When it is positive, one variable tends to increase as the other increases. Correlation coefficient takes the values between the limits -1 and +1. A high absolute value of r indicates a close relationship and a small value, a less definite relationship.

Where r=1, the points fall exactly on a straight line and relationship is perfect. When the samples is randomly drawn r is of less important when the bivariate distribution is not normal but it can still be in use as overall measure of liner association.

On the basis of assumed indicators, the relationship in between agro-socio-economic variables and socio-economic variables for 1995 have been shown in table 4.21, each of the variable have been computed and tested.

The indicators X1 (Junior Basic Schools/ Number of schools per lakh population), X5 (junior basic schools/teacher pubil Ratio, and X 11 (Percentage of electricity consumption in agriculture sector in total electricity consumption) are positively significant at 95 percent level of confidence with Y^1 (intensity of cropping). The variable X 20 (Credit facilities in Banking), alone, is negatively correlated with Y^1 at 1 percent level of significant. X12 (per head electricity

Table 4.21 Correlation (r) Between Agro-socio Economic Indictors and Socio Economic Indictors 1995.

Indicators	Y1	Y2	Y3	Y4	Y5
X1	.437(*)	-0.086	0.029	-0.243	0.187
X2	0.401	-0.04	0.071	-.411(*)	0.107
X3	0.274	0.32	0.402	-0.186	0.233
X4	0.329	0.35	.472(*)	0.039	0.349
X5	.422(*)	-0.069	0.059	0.126	0.118
X6	-0.161	0.124	0.245	0.287	0.288
X7	0.236	0.178	0.265	0.35	0.346
X8	0.341	-0.068	0.017	0.263	0.245
X9	0.252	.628(**)	.660(**)	0.367	.593(**)
X10	0.164	0.202	0.278	0.255	0.208
X11	.499(*)	-0.23	0.031	-0.368	0.163
X12	-0.023	.421(*)	0.387	0.394	0.182
X13	-0.041	0.166	-0.097	0.204	0.141
X14	-0.014	.447(*)	0.245	0.276	0.312
X15	0.287	0.322	0.144	0.092	0.34
X16	0.043	.470(*)	0.157	0.189	0.13
X17	0.09	.532(**)	.535(**)	0.291	0.251
X18	0.186	-0.189	-0.059	-0.255	-0.089
X19	0.018	.521(**)	.449(*)	0.298	0.333
X20	-.533(**)	0.065	-0.009	0.234	-0.098
X21	-0.233	.606(**)	0.237	0.142	-0.21

(*) Significant at 5 percent level
(**) Significant at 1 percent level
Source: District statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

consumption (Kilowatt/ hrs.), X14 (family and mother child welfare/health centres) and x16 (Deposit in national income in lakh) have positive high degree significant at 95 percent level of confidence with Y^2 (% of area under commercial crops). With Y^2, the relationship of four indicators, X9 (Total length of Roads / Road ways), X 17 (Deposited money per person/ income), X19 (Nationalized Bank Branches) and X 21 (Number of telephone per lakh population) are positively correlated at 1 percent level of significant. X 4 (Degree college / per lakh population) and X 19 (Nationalized Bank Branches) are positively correlated with Y^3 (Average production of food crops / Quintals) at 95 percent level of confidence. The other two indicators X9 (Total length of Road/ Roadways) and X 17 (Deposited money per person) have positive Correlation with Y^3 at 1 percent level of significant.

Only one indicator X 2 (Senior basic schools / Number of school per lakh population) has high degree of negative relationship with Y^4 (fertilizers used per hectare /kg) at 95 percent level of confidence. The indicator x_9 (total length of roads / Road ways) is positively related with Y^5 (% of net areas irrigated in gross area) at 1 percent level of significant.

Our analysis on rural development shows that agricultural technology is important for raising agricultural growth. Agricultural growth and developments of the rural non farm sector are important for creating productive employment, which in turn reduces rural poverty. Heavy participation of user groups and non-governmental organizations (NGOS) in maintaining public infrastructure is required to run the process of rural development from top down to bottom up.

Assuming an interval of ten years, from the year 1995, another correlation coefficient has been computed for the year 2005. The same has been shown in table 4.22.

Table 4.22 Correlation (r) Between Agro-socio Economic Indictors and Socio Economic Indictors 2005.

Indicators	Y1	Y2	Y3	Y4	Y5
X1	0.132	-0.264	-0.093	-0.092	0.074
X2	0.084	-0.261	-0.07	-0.107	0.02
X3	-0.276	0.058	0.047	-0.234	-0.229
X4	-.491(*)	-0.287	0.249	-0.111	0.23
X5	-0.003	-.582(**)	-0.312	-.529(**)	-0.171
X6	-0.347	-0.258	0.183	-0.198	0.113
X7	-0.306	-0.206	-0.286	-0.068	-0.03
X8	.467(*)	-0.32	-0.151	-0.176	0.018
X9	-0.032	0.359	-0.026	0.008	0.046
X10	-0.362	.458(*)	.446(*)	0.015	0.158
X11	0.16	-0.143	-0.191	0.047	0.026
X12	-.712(**)	0.034	.414(*)	-0.033	0.256
X13	0.194	0.261	-0.185	0.117	0.011
X14	0.181	0.132	-0.103	-0.051	-0.073
X15	0.155	0.285	-0.13	0.084	-0.027
X16	0.23	-0.103	-0.171	0.086	0.009
X17	-.623(**)	-0.041	0.343	-0.181	0.216
X18	0.07	-0.147	-0.189	-0.297	-0.346
X19	-0.335	.506(*)	.435(*)	0.152	0.197
X20	-0.269	0.309	-0.204	-0.145	-0.238
X21	-.637(**)	-0.185	0.268	-0.088	0.299

(*) Significant at 5 percent level
(**) Significant at 1 percent level
Source: District statistical Bulletin
www:\\upgov.up.in/engspatrika\2spmenu.asp?state=v2

Only one indicator i.e, X_8 (Degree college/Teacher public ratio) has the highest degree of positive correlation with Y^1 at 95 percent level of significance. Among four indicators, the three indicators namely X 12 (Perhead electricity consumption in kilowatt hrs.), X 17 (Nationalised Bank branches / Credit facilities) and X 21 (Number of telephone per lakh population) have negative correlation with Y^1 at 1 percent level of significant. The lone indicator X4 (degree college per lakh population) has only high degree of negative correlation with Y^1 at 95 percent level of significance. X5 (junior basic schools teacher pupil ratio) is negatively related with Y^2 at 1 percent level of significant. In the same group in relation with Y^2 the indicators X 10 (% of electrified villages in total inhabited villages) and X 19 (Nationalised Bank branches/ credit facilities) have high degree of negative correlation at 95 percent level of significant. All three indicators in the same group, X 10 (% of electrified villages in total inhabited villages), X 12 (Per head electricity consumption in kiloweatt hrs) and X 19 (Nationalised Bank Branches / Credit facilities) are highly positively related with Y^3 at 95 percent level of significance. Only one variable x 5 (junior basic schools / teacher pupil ratio) is negatively correlated with Y^4 at 1 percent level of significance.

Although agriculture can make a significant contribution to growth, employment creation and poverty reduction on its own will not drive the full economic transformation. Further more, growing rural incomes, by inducing greater demand for industrial products through what economists call multiplier effect, will give an impetus to industrial growth too. It is upto policy makers to find ways of accelerating growth in the service and manufacturing sectors, which will require continued economic liberalization and privatization.

Conclusion & Suggestions

In the light of ongoing discussion and analysis certain conclusion can be drawn. The level of commercialization and growth in yield of major crops, bear testimony to the fact that technical variables, such as use of fertilizers, irrigation, and HYV seeds, environmental variables such as rainfall, soil fertility and economic variables such as size of land holdings, size of markets, availability of power for agricultural use are significant determinants of agricultural performance in the study area. It has been found that western Uttar Pradesh showed higher production elasticity's for fertilizers, tube wells, tractors, irrigation and regulated markets, suggesting that production in the region was more responsive to modern inputs and infrastructure.

Taking in view to the districts of study area, the out put growth rates have marked regional variability. It has seen that crop production has been fluctuating and at times quite sharply. There is virtual stagnation in the highest yield of paddy, wheat, oil seeds and pulses. Further more, production has been dipping with fluctuation in rainfall.

Increase in the proportion of gross cropped area under wheat and rice were registered. Areas under wheat increased and coarse cereals continued to decline while oil seed dropped substantially. The decline in area under pulses stopped and even reversed slightly as it has increased. Net irrigated area as a percentage of net cropped area was substantially higher in the study area. Even, significant increase in rice yield has been reported. The study area marginally expanded gross cropped area under wheat and the yield of wheat was higher through the successive years. The inputs trend was more pronounced in the high fertile soil areas of the region with those of influential farming community under high income groups.

The region saw a decline not only in yield levels, but in area under cultivation of Pulses, as well as irrigated area as a percentage of area under

Pulses. Therefore, as a result it has been seen that output of pulses has declined in western Uttar Pradesh. The western Uttar Pradesh increased its area under sugar cane cultivation marginally, as well as almost imperceptible increase in irrigation levels, but yield levels declined.

The main source of productivity increase was technological breakthrough in wheat and rice. Since the green revolution technology involved use of modern farm inputs, its spread also led to fast growth in agro-input industry. The multifold increase in productivity and self sufficiency in food grains were the biggest achievement of new agricultural strategy in the region which came via green revolution technology. Since the study is to covered a geographic spread as well as can over view of different levels of development of commercialization and agribusiness in the study area. It has been found that food market at all levels are under going profound changes that are fuelled by rapid urbanization; diet diversification; trade integration; and the liberalization of foreign direct investment in the food sector. This led the most commonly observed change in commercialization and diversification of domestic product systems in the region. It has been assessed that increasing commercial product systems can fulfill the rapidly rising urban food demand and changing consumption pattern at domestic levels and in international markets. The changing dietary habits have been observed through out the region. This observed assessment call that there is a need to produce a comprehensive statement that identifies opportunities, constraints, and strategies; priorities approaches for development of commercial agriculture and agribusiness and identifies complementary policy and institutional reforms needed.

It has been observed that the transformation of diets and rising import competition will contribute to the increasing commercialization of the small farm sector. Investment in rural agricultural infrastructure can also play a crucial role towards agricultural commercialization in the

region. Further, high value agricultural products have higher employment opportunity and if the small holders participate it can be suitable for them. Thus, this new trend of agriculture and agribusiness sector could be a major engine of income and employment growth for the region. Now, the focus and priorities of government should be to shift from heavy support and protection of food staples to promotion of agricultural diversification, processing and commercialization. Farmers of the region must shift into high value products to increase their incomes. The private business sector can play a dominant role in these higher-value market chains and emerging new agricultural trend. This change will require a fundamental shift in thinking in many public agencies that are still geared toward the dominant role that the state played in the market chains for staple food during the green revolution era.

In this shifting paradigm, the government initiatives towards a strong and dynamic food processing industry play a vital role in diversification and commercialization of agriculture. This set of combined approaches in addition can enhance income and generate employment. Agribusiness has already been identified as a strategic priority in the region. Agribusiness could have a significant role in rural and economic development, and agro-enterprises could be a major source of rural non-farm employment and income.

Basic socio-economic data suggests some strengthening of certain economic and social indicators, but also a number of areas for concern. Per capita income grew, largely led by the green revolution, with growth in services. These services include IT, insurance banking etc. However, such services have comparatively low absorption of the kinds of labour that the poor can provide. Absorbedly, social upliftment requires social investments. This social investments need to address the immediate requirements of poor (social safety nets, health interventions, food programme); and long term development programmes to enhance and

promote agriculture and rural development and to create employment. Coherence between policies and investments to increase productivity and economic efficiency is also needed. The primary objective of the research system remains to generate new technologies through commercialization that sustainably improve productivity and farmers' income.

There is considerable variation in economic and social conditions across the region. As it is clear that agriculture has special significance for low income, poor and vulnerable sections of rural society, of the region because of these reasons agriculture is at the core of socio-economic development of the society of the region and proper policy for agricultural sector is crucial to improve living standards and to improve welfare of masses. At the other end of the scale are better health facilities, education, and awareness which are key developmental priorities but are often ineffectively implemented due to conflicts, policy gap and sheer magnitude of the problems.

The region does not fair much better in terms of education than it does in health. It has been seen that levels of poverty contribute poor levels of performance on social indicators of development. There has been dramatic increase to total length of roads – surfaced to un-surfaced roads. Electricity consumption per capita is improving - gradually. The increase in yields and agricultural productivity in rural areas of the region can be transmitted into development gains for the rural poor. The findings of commercialization lend ample support to an approach that aims to capture the employment and income gains from commercialization that are beneficial for the poor. In this regard, policy has a key role to play in shaping the successes and failures of commercialization from a growth and poverty perspective. The study reveals that the process and implementation of broad based commercialization in the region has an impressive employment opportunity and welfare effects for the poor.

Agro-socio-economic and socio-economic indicators have been employed to measure correlation among variables. Correlation analysis reveals that education, income, communication facilities and per head electricity consumption is positively related to average production of food crops / percentage of commercial crops. This shows that economy of the region is largely dependent on agricultural sector. It is the sector which determines all walks of life to the concerned people, while credit facilities, banking, per head electricity consumption, and communication facilities are negatively associated with cropping intensity. In terms of fertilizers used per hectare are negatively related to education.

Agricultural growth is essential for the development and progress of the region and for over all growth of the economy. This growth rate is also an important requirement for improving living standard of those who are dependent on agriculture.

SUGGESTIONS

Researcher suggests a range of strategies in response to commercialization of agriculture and its impact on socio-economic development. They are given below

- Investments in research and development and extension services could have a tremendous impact on commercialization of agriculture and should be an integral part of an agricultural growth strategy for the region.
- Agriculture should to move from "subsistence farming" to 'market driven farming' with a view to maximize the returns for the farmers and making farming a remunerative, attractive occupation.
- The role of markets and access to them, in terms of basic infrastructure like roads, storages, refrigerators and transports need further attention.
- Apart from proper mixed cropping with a view to increase productivity and income, the farm should also include subsidiary activities like dairying, goatery, rural back yard poultry etc. so as to maximize returns for the small and marginal farmers.
- The existing potential of horticultural products like vegetables and fruits can be harnessed with adoption of scientific methods of production, making best use of agricultural labour force and adopting proper post-harvest technology at farm / village level. Hence, the production and profitability from fruits and vegetables crops can be increased many folds.
- The regions livestock potential should also be harnessed through the development of livestock husbandry and establishment of processing units of animal products. It would be boon for rural poor, especially landless, marginal and small farmers in the region.

- The diversification of agricultural units substantially value added should be developed by encouragement through contract / cooperating farming on scientific lines.
- The gainful employment for surplus labour force in the villages through development of agro-processing, agro-clinic and agro-service centre facilities should be promoted and expanded.
- Sugarcane is one of the major crops of the region, as the sugar industry in the state is becoming sick very rapidly, proper attention should be given on its modernization and renovation.
- The government could have helped by arranging and purchasing the crops and exporting it, to international market.
- Extending of financial support of modernization of the agro-processing units also needed.
- Agricultural innovation and diffusion must reach all over the country, irrespective of size of land holding.
- Strengthening of marketing, processing, value addition, infrastructure and emphasis on biotechnology for the development of high yielding seeds need attention.
- The diversity of income generating activities in the rural areas calls for policies investing in rural health and education, electrification and rural roads.
- Use of chemical fertilizers has deteriorated the quality of soil. Therefore, integrated paste management and use of organic fertilizers should be promoted at a larger level.

In order to implement these intentions a concrete and time bound action plan is needed. The subsequent step is, how and when policy goals and objectives would be achieved.

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